Hitachi AC Servo Drive

AD Series Setup Software

AHF-P01/P02

Instruction Manual

Thank you for purchasing Hitachi AC Servo Drive Setup Software.

This instruction manual describes all the functions of Hitachi AC Servo AD Series Setup Software AHF-P01 and furnishes the common usage instructions for AHF-P01 and AHF-P02, excluding AHF-P02's program editor functions. For proper software installation and use, thoroughly read this instruction manual before using the software. For AHF-P02's program editor functions and program operation functions, refer to the instruction manual entitled "Hitachi AC Servo Drive Setup Software Programmable Functions".

Ensure that this instruction manual is delivered to the end user.

Read and keep this manual handy for your quick reference.

HITACHI

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■ IMPORTANT

Keep this instruction manual at a place near the software operating personnel.

Before installing, running, or otherwise using the software, be sure to thoroughly read this instruction manual. Use the software properly in accordance with the knowledge of the machine, safety instructions, precautions, operating instructions, and other handling procedures.

Always use the software without exceeding the specified limits stated in this instruction manual. It is also essential that you perform proper inspection and other maintenance procedures to prevent failures.

■ NOTICES

- The contents of this instruction manual are subject to change without prior notice.
- Carefully keep this instruction manual because it will not be reissued.
- No part of this instruction manual may be reproduced or reprinted without permission.
- Every precaution has been taken in the preparation of this instruction manual. However, if you find any errors or omissions in this document or experience any doubt about the contents of this document, contact your Hitachi representative.
- Notwithstanding the foregoing, Hitachi cannot be responsible for the results of the use of this manual or product described in it.
- The AC Servo Drive Setup Software is copyrighted by Hitachi, Ltd. Hitachi, Ltd. holds the copyright and all other rights to this software.
- The AC Servo Drive Setup Software is used to connect the Hitachi AC Servo Drive AD Series to a personal computer. It does not operate independently. When operating a servo drive, thoroughly read its instruction manual as well as this instruction manual for safety assurance.
- Windows, Windows NT, and Windows 2000 are trademarks of Microsoft Corporation in the U.S.

SAFETY PRECAUTIONS

The AC Servo Drive Setup Software is used to connect the Hitachi AC Servo Drive AD Series to a personal computer. It does not operate independently. When operating a servo drive, thoroughly read its instruction manual as well as this instruction manual for safety assurance.

The safety precautions set forth in this instruction manual are classified into the WARNING and CAUTION categories.

⚠ WARNING	: Indicates that a hazardous situation may arise to cause death or serious injury if the correct handling procedure is not followed.
⚠ CAUTION	: Indicates that a hazardous situation may arise to cause moderate or minor injury or incur property damage only if the correct handling procedure is not followed.

If the instructions set forth under NOTE are ignored, serious consequences may result depending on the situation.

The instructions and precautions set forth under the above categories are all important and must be observed at all times.

After this instruction manual is read, it must be stored at a predetermined place so that the user of the software can readily refer to it at any time.

■ Wiring precautions

⚠ CAUTION

1. When disconnecting or connecting the communication cable, be sure that the servo drive and personal computer are both turned off. If you disconnect or connect the communication cable while the power is on, the servo drive and personal computer may become defective.
2. While the AC Servo Drive Setup Software is running, never disconnect or connect the communication cable. When the communication cable is reconnected, be sure to exit the software and restart. If you do not restart the software, the software and servo drive may malfunction.

■ Usage precautions

⚠ CAUTION

1. When the servo drive control power is turned off, be sure to exit the AC Servo Drive Setup Software and restart. If you turn on the servo drive control power without exiting the software, the software and servo drive may malfunction.
2. Do not turn off the servo drive control power while the initialization or parameter rewrite process is in progress. If the servo drive control power turns off during a write, the EEPROM data in the servo drive may become damaged, causing the servo drive to improperly operate.

MEMO

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MEMO

CHAPTER 1 Installing/Uninstalling the Software

This section describes the preinstallation checkout procedure, installation procedure, uninstallation procedure, and upgrade procedure for the AC Servo Drive Setup Software.

1. Installing/Uninstalling the Software
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1. Installing/Uninstalling the Software

The install program (SETUP.EXE) supplied on a product disk creates a new directory on a specified hard disk and copies files to install the software.

1.1 Preinstallation Checkout

Before installing the software, complete the following checks:

1- Space check

Before installing the software, check that the installation destination hard disk has at least 30MB of free space.

2- Operating environment check

Check that the employed personal computer and OS meet the following requirements:

PC: Windows

NOTE: Make sure that the PC provides an RS-232C connection.

Memory: At least 32MB (64MB or more recommended)

Monitor resolution: 800 x 600 or higher recommended

Free hard disk space: At least 30MB

OS: Windows® 95/98/Me, Windows NT® 4.0 (Service Pack 3 or later), Windows 2000®, or Windows ®XP

* Windows, Windows NT, and Windows 2000 are trademarks of Microsoft Corporation in the U.S.

1.2 Installation Procedure

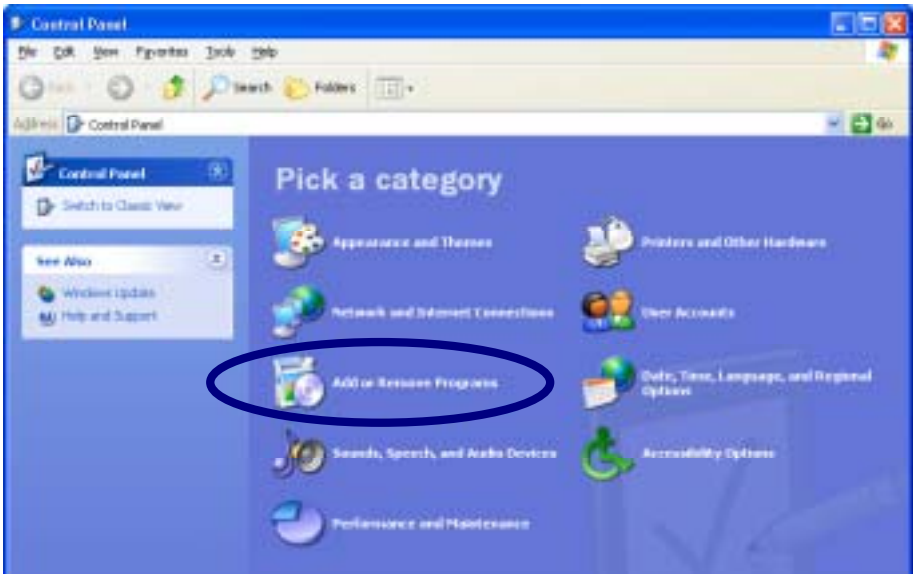
The following instructions presume that you install the software onto hard disk drive C from floppy disk drive A.

1- Start Windows 95/98 or Windows NT, Windows 2000, or Windows XP.

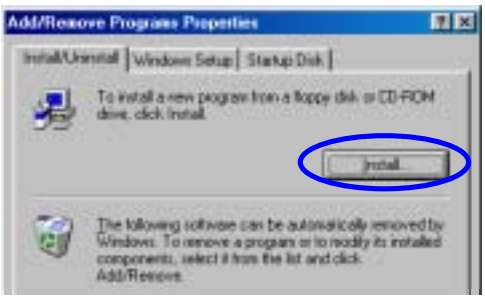
2- Exit unnecessary resident programs.
(If you do not observe this precaution, the installation process may become unstable or fail.)

3- From the menu on the taskbar, choose [Settings] and then click [Control Panel].

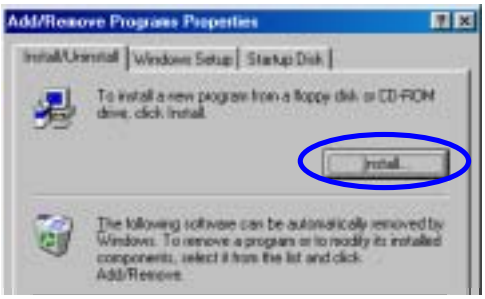
In case of Windows XP, choose [Control Panel] from the menu on the taskbar.



4- Click the [Add/Remove Programs] icon to open the following window:
In case of Windows XP, click the [Add or Remove Programs] icon.


Add/Remove Programs Properties
Install/Uninstall
Windows Setup
Startup Disk
To install a new program from a floppy disk or CD-ROM drive, click Install.
Install...
The following software can be automatically removed by Windows. To remove a program or to modify its installed components, select it from the list and click Add/Remove.

OS: In case of Windows 98


Add/Remove Programs Properties
Install/Uninstall
Windows Setup
Startup Disk
To install a new program from a floppy disk or CD-ROM drive, click Install.
Install...
The following software can be automatically removed by Windows. To remove a program or to modify its installed components, select it from the list and click Add/Remove.

OS: In case of Windows NT

Add or Remove Programs
Add a program from CD-ROM or floppy disk
To add a program from a CD-ROM or floppy disk, click CD or Floppy.
CD or Floppy...
Add programs from Microsoft
Windows Update
Add New Programs
Add/Remove Windows Components

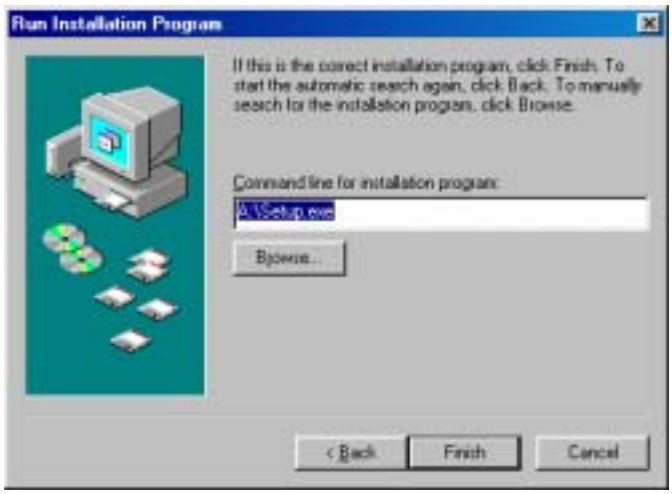
OS: In case of Windows XP

5- From the window shown above, click the [Install] button.
In case of Windows XP, click the [Add New Programs] icon and then click the [CD or Floppy] icon.

6- When the following window opens, insert Setup Disk 1 for the product into the PC's floppy disk drive.

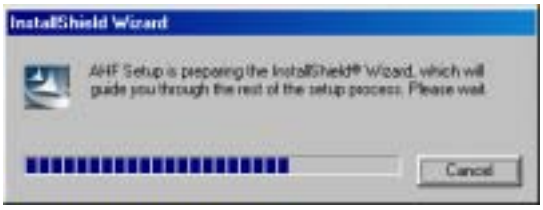
Install Program From Floppy Disk or CD-ROM
Insert the product's first installation floppy disk or CD-ROM, and then click Next.
< Back
Next >
Cancel

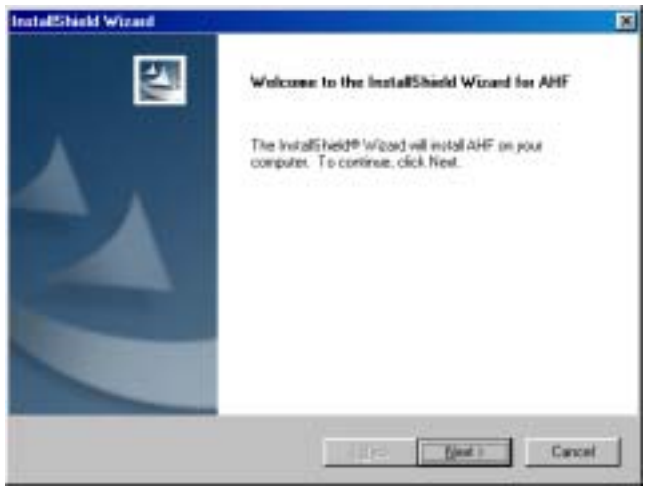
7- After the product disk is inserted into the floppy disk drive, click the [Next] button. When the following window opens, verify the selected drive and then click the [Finish] button. If a wrong drive is selected, click the [Browse] button to select the "setup.exe" file on Setup Disk 1.


Run Installation Program
If this is the correct installation program, click Finish. To start the automatic search again, click Back. To manually search for the installation program, click Browse.
Command line for installation program:
A:\Setup.exe
Browse...
< Back
Finish
Cancel

8- When the install program starts as indicated below, select the language to install and click the [OK] button. (The default language is set according to the language setting of Windows.)

9- When the install program starts as indicated below, click the [Next] button.



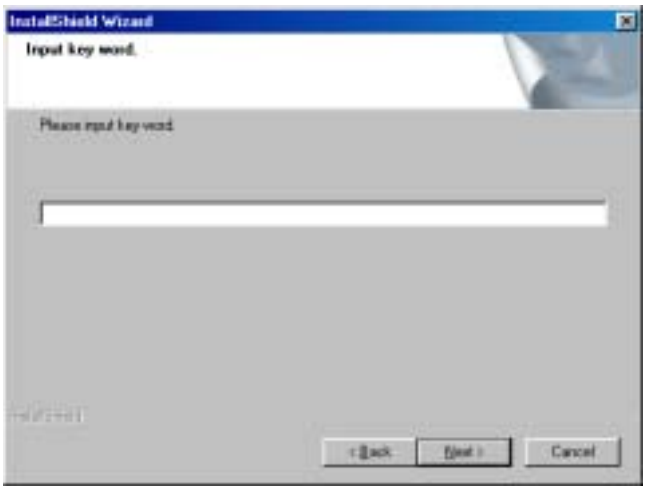

InstallShield Wizard
Welcome to the InstallShield Wizard for AHF
The InstallShield® Wizard will install AHF on your computer. To continue, click Next.
Next >
Cancel

10- Select an installation destination folder. To select a folder other than the default one, click the [Browse] button to specify the installation destination folder.

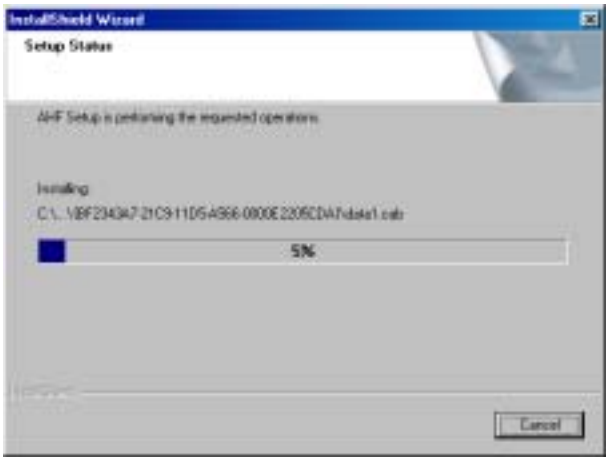
InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install AHF in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\AHF
Browse...
< Back
Next >
Cancel

After completion of folder selection, click the [Next] button.

11- Select the product you want to install. For the standard software (AHF-P01), do nothing but click the [Next] button.

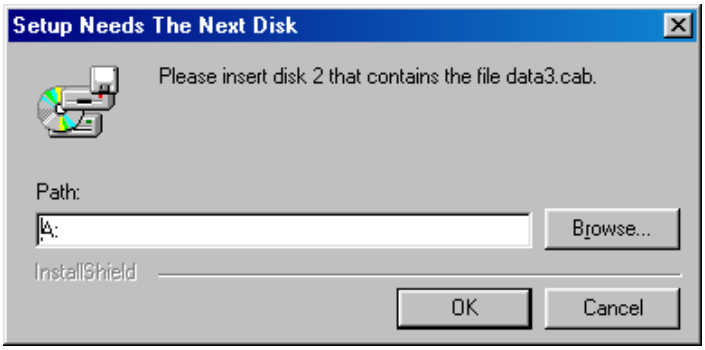


12- The file copy process then starts.

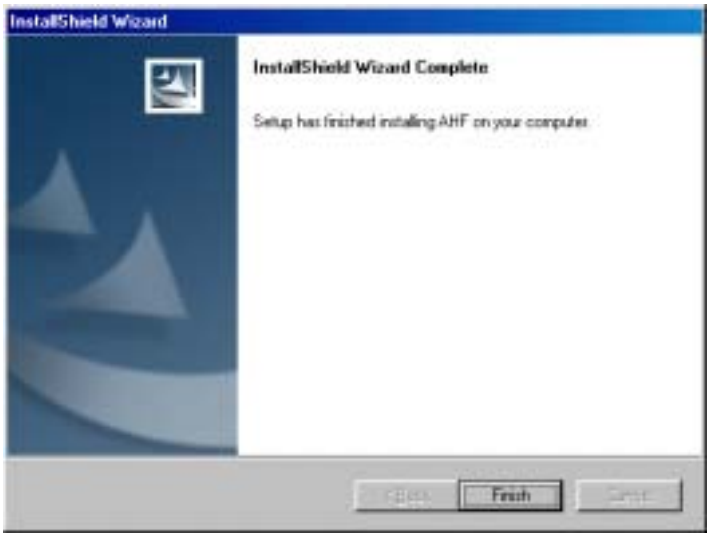


13- When the files on the first product disk are completely copied, the following dialog box opens. Insert Setup Disk 2 into the floppy disk drive and then click the [OK] button to resume the file copy process. Repeat this procedure for the remaining disks (Setup Disks 3,4 and 5).

NOTE) All the setup disks may not always be used for a reinstall.

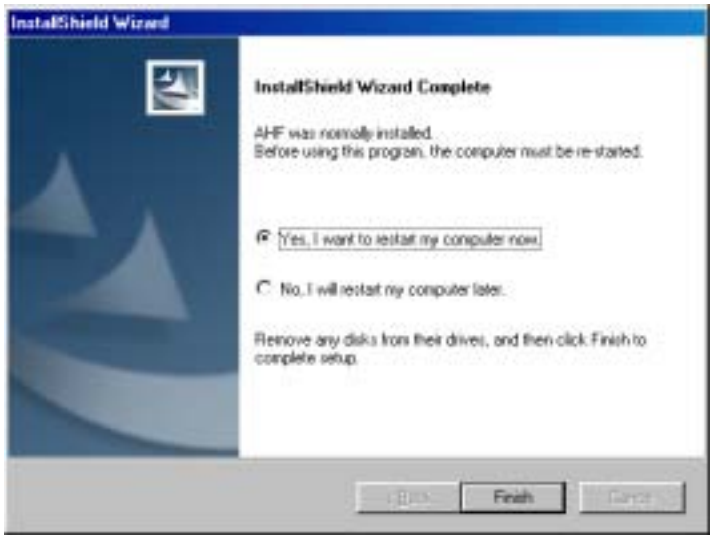


14- When the file copy process entirely terminates, the following window opens. Click the [Finish] button.



* The above window does not open if the employed OS is Windows NT.

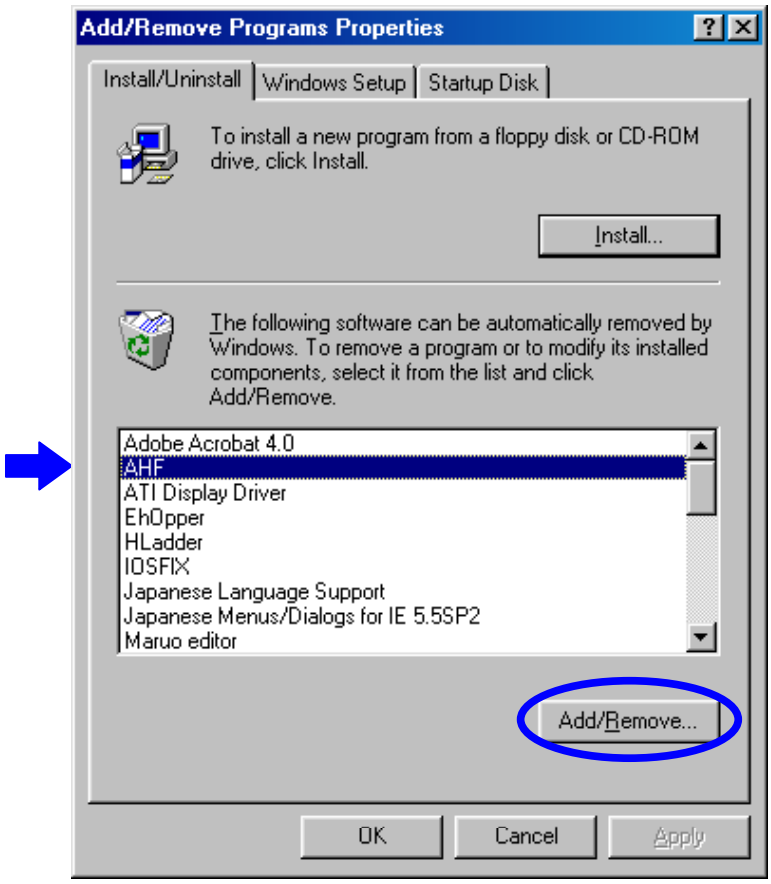
15- The system needs to be updated and restarted. When the following window opens, close all the other open applications, choose "Yes, I want to restart my computer now", remove the product disk from the floppy disk drive, and click the [Finish] button to restart the system.


InstallShield Wizard
InstallShield Wizard Complete
AHF was normally installed.
Before using this program, the computer must be re-started.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
Finish

1.3 Uninstallation Procedure

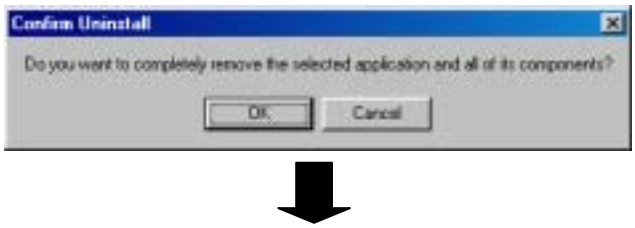
You can uninstall the software by performing the following steps:

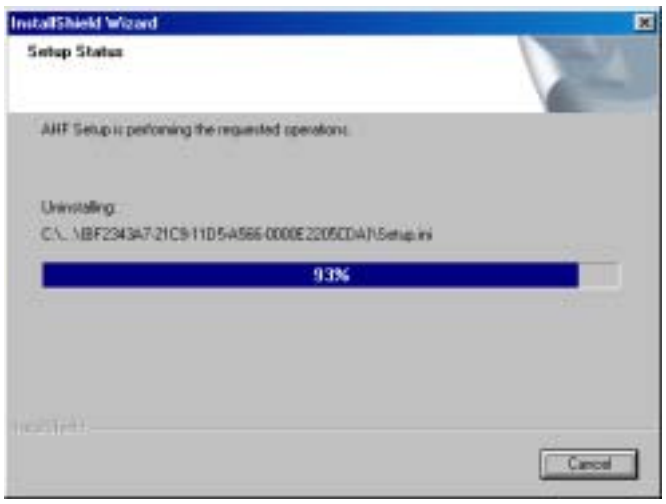
1- From the menu on the taskbar, choose [Settings] and then click [Control Panel]. From the Add/Remove Programs window, choose the [Install/Uninstall] tab, and then select "AHF" to uninstall it.



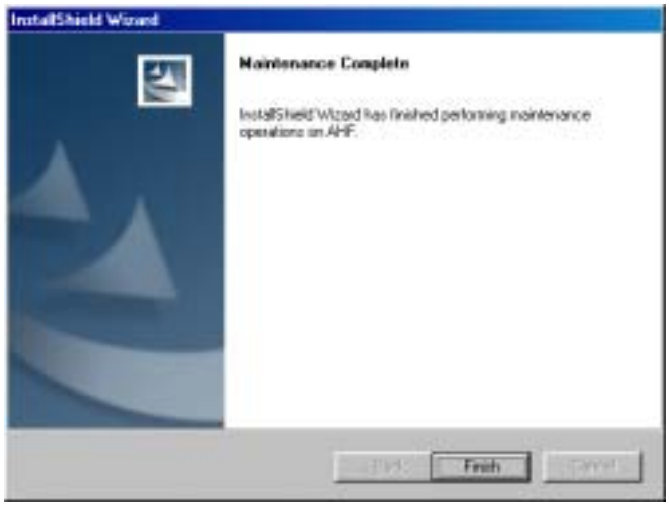
In case of Windows XP, to remove AHF from your PC, choose [Control Panel] from the menu on the taskbar, click the [Add or Remove Programs] icon, choose [AHF] and then click the [Change or Remove Programs].

2- The same program then starts as for installation and displays the following dialog box. Click the [OK] button in the dialog box. The AHF uninstallation process then starts.





3- When AHF is uninstalled, the following window opens. Click the [Finish] button to conclude the uninstallation process.



1.4 Upgrade Procedure

To upgrade the software, first uninstall the existing version of Setup Software AHF in a manner explained earlier and then install the new version.

CHAPTER 2 Connecting to AD Series Servo Drive

This section describes the cable for connecting the personal computer to the AD Series Servo Drive and explains how to make the connection.

2. Connecting to AD Series Servo Drive
2.1 Connection Cable 2-2
2.2 Connecting to the Servo Drive 2-2

2. Connecting to AD Series Servo Drive

■ Wiring precautions

⚠ CAUTION

1. When disconnecting or connecting the communication cable, be sure that the servo drive and personal computer are both turned off. If you disconnect or connect the communication cable while the power is on, the servo drive and personal computer may become defective.
2. While the AC Servo Drive Setup Software is running, never disconnect or connect the communication cable. When the communication cable is reconnected, be sure to exit the software and restart. If you do not restart the software, the software and servo drive may malfunction.

■ Usage precautions

⚠ CAUTION

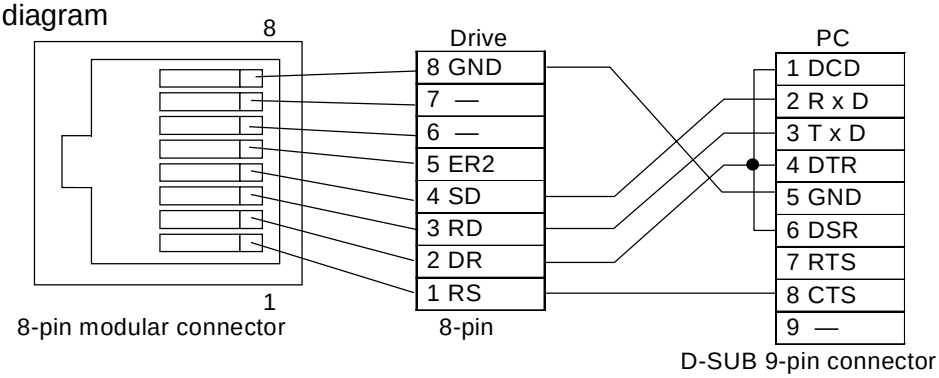
1. When the servo drive control power is turned off, be sure to exit the AC Servo Drive Setup Software and restart. If you turn on the servo drive control power without exiting the software, the software and servo drive may malfunction.
2. Do not turn off the servo drive control power while the initialization or parameter rewrite process is in progress. If the servo drive control power turns off during a write, the EEPROM data in the servo drive may become damaged, causing the servo drive to improperly operate.

This section explains about the connection between the AD Series Servo Drive and PC.

2.1 Connection Cable

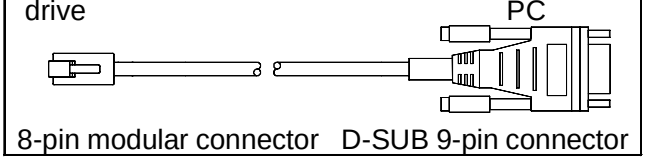
Create a cable that is wired as indicated below, or purchase the product suggested below:

Wiring diagram



The communication cable between the drive and PC

Model	Name
ADCH-AT2	The communication cable between the drive and PC



2.2 Connecting to the Servo Drive

With the above-mentioned cable, connect the servo drive to the personal computer.

Servo drive : Connector marked "PC"

Personal computer : RS-232C connector

CHAPTER 3 Operating Procedures

This section describes the procedures for launching and exiting the AC Servo Drive Setup Software, exercising its monitoring, parameter setup, operation trace, and test run functions, and changing the communication format.

3. Operating Procedures
   - 3.1 Launching and Exiting 3-2
   - 3.2 Monitoring Function 3-4
   - 3.3 Parameter Setup Function 3-6
   - 3.4 Operation Trace Function 3-17
   - 3.5 Test Run and Adjustment Functions 3-27
   - 3.6 Changing the Communication Format 3-45
   - 3.7 Setting Motor parameters 3-46

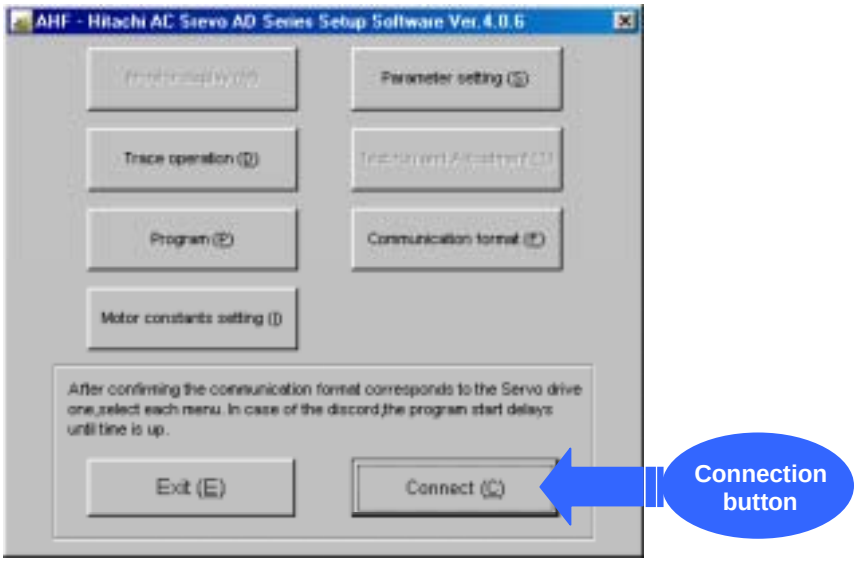
3. Operating Procedures

3.1 Launching and Exiting

3.1.1 Launching the software

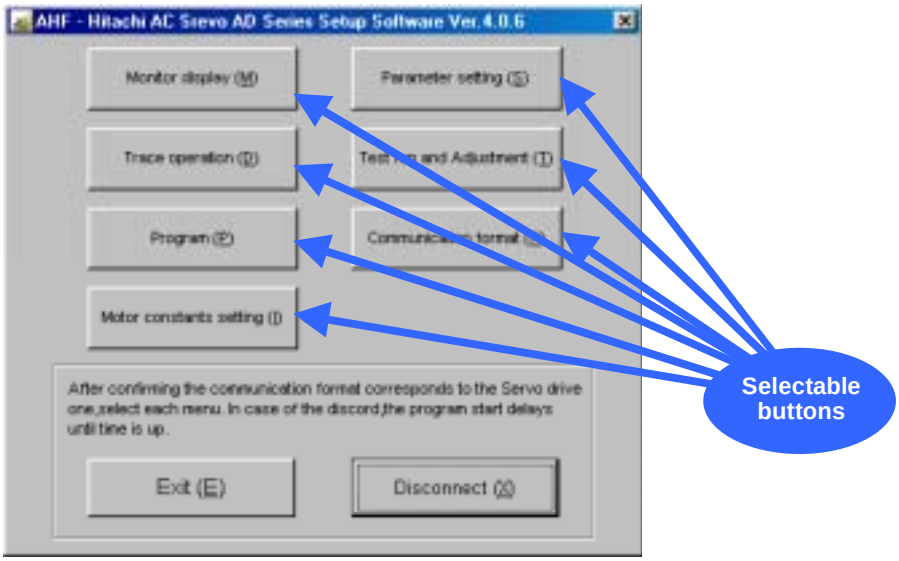
1- From the menu on the task bar, choose [Programs (P)], point to [Ahf], and then click [Ahf].

2- The software then starts and opens the following window:


AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Parameter setting (S)
Trace operation (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Connect (C)
Connection button

3- To connect to the servo drive, click the [Connect (C)] button. When the connection is established normally, the following window opens in several seconds, offering you an increased number of selectable buttons.

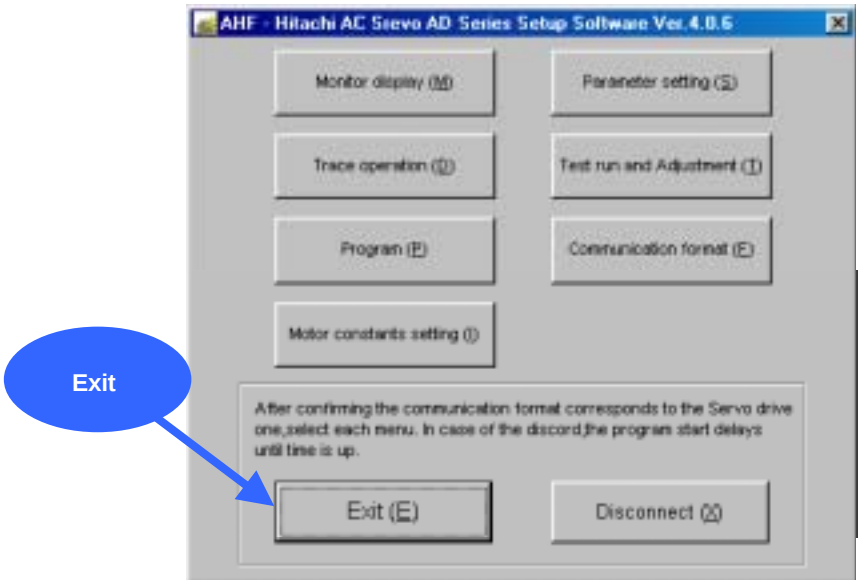
If the connection is not properly established, see Section 4.1, If the Servo Drive Cannot Be Connected.


AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (T)
Program (P)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (D)
Selectable buttons

3.1.2 Exiting the software

(1) In the case of exiting AHF

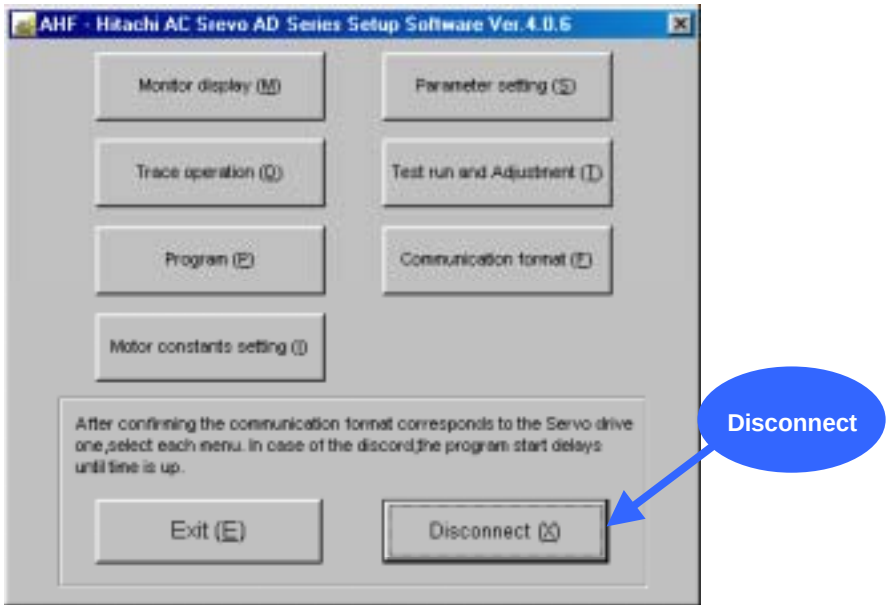
1- Close all open windows except the opening window.


AHF - Hitachi AC Sevo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (O)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
Exit

2- In the opening window, click the [Exit (E)] button.

(2) In the case of exiting only connection

1- Close all open windows except the opening window.


AHF - Hitachi AC Sevo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (O)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
Disconnect

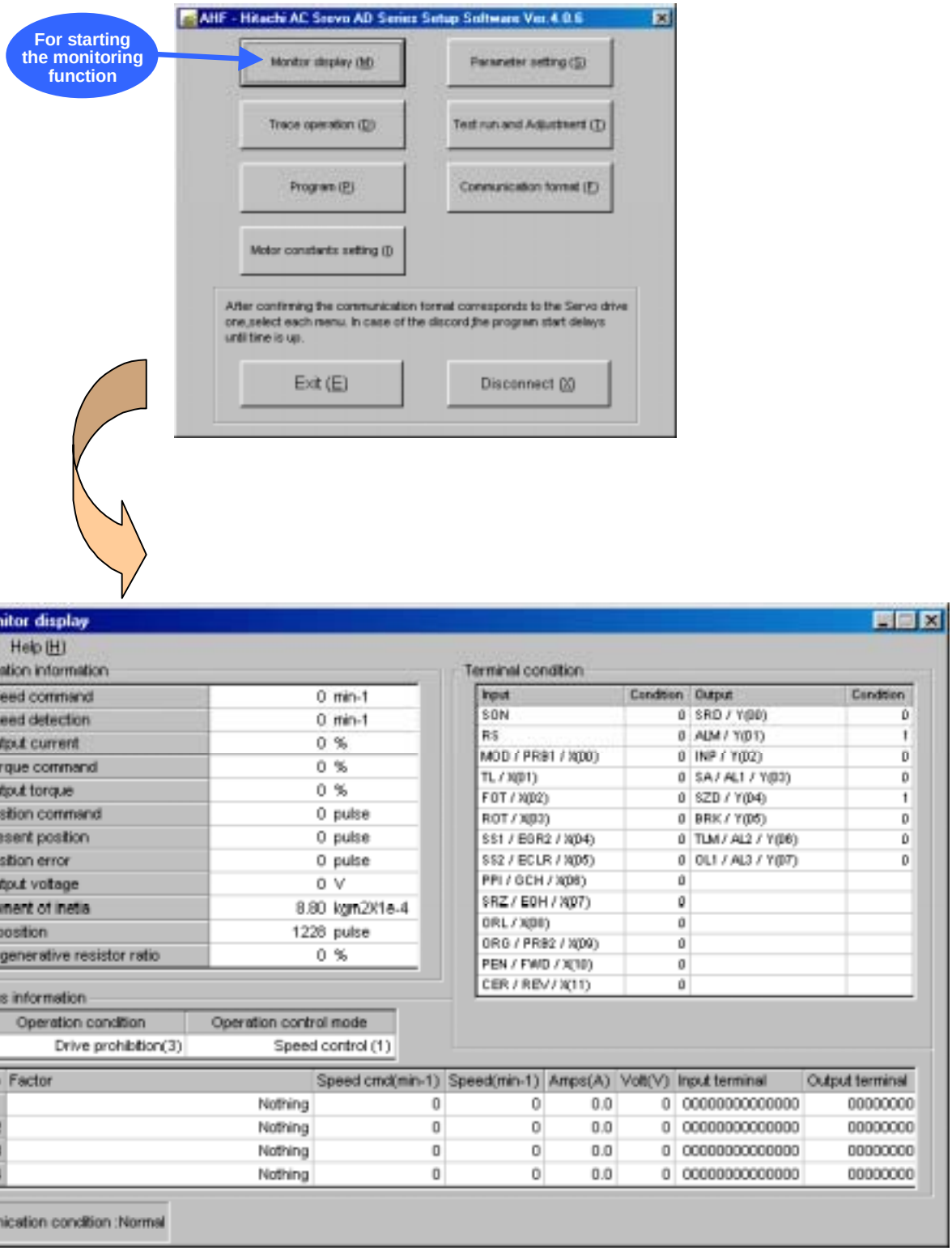
2- In the opening window, click the [Disconnect (X)] button.

3.2 Monitoring Function

You can use the monitoring function to view the operation information in real time.

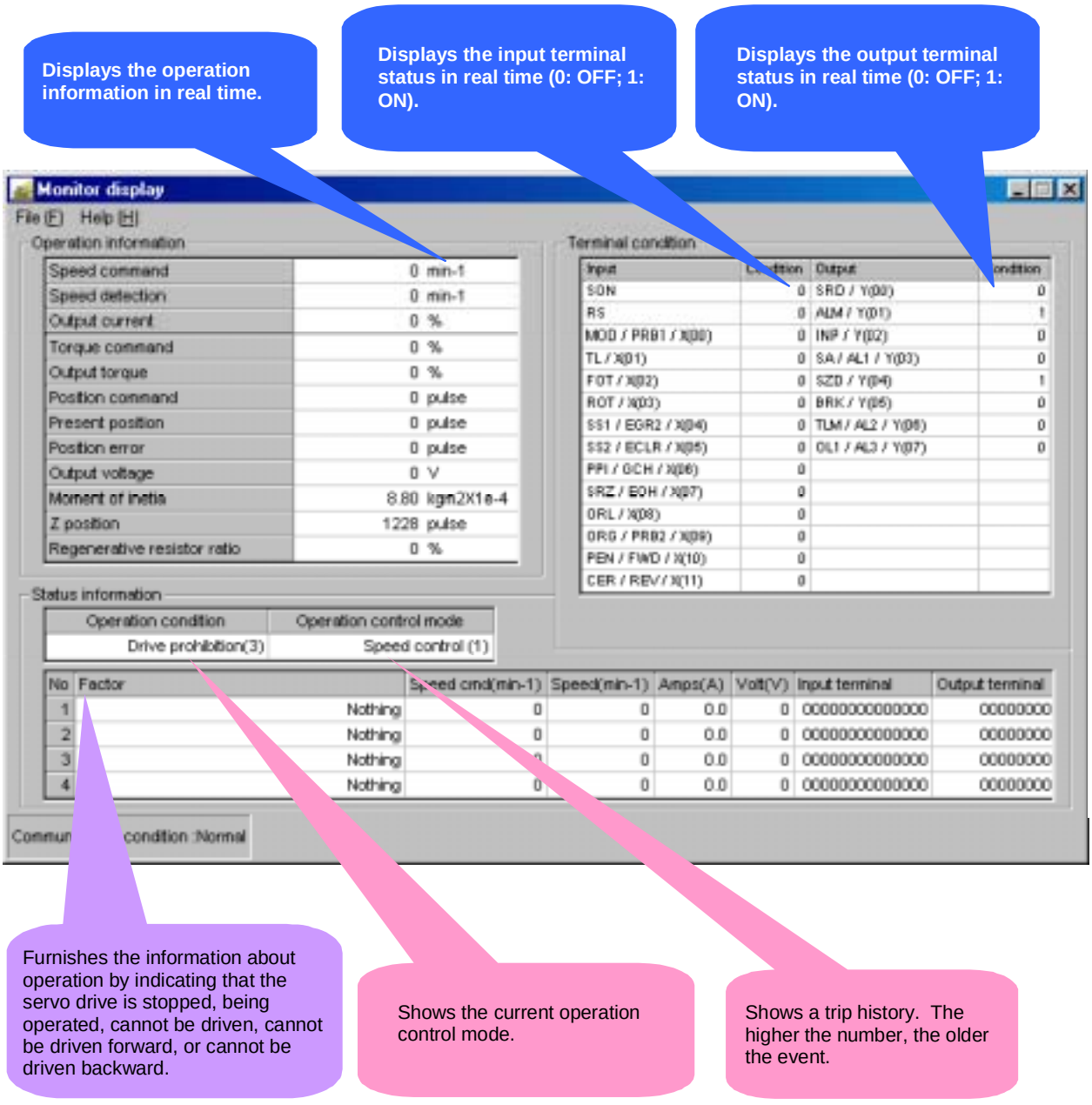
3.2.1 Starting the monitoring function

In the opening window, click the [Monitor Display(M)] button. The following window then opens:


For starting the monitoring function
AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (D)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
Monitor display
File (F) Help (H)
Operation information
Speed command 0 min-1
Speed detection 0 min-1
Output current 0 %
Torque command 0 %
Output torque 0 %
Position command 0 pulse
Present position 0 pulse
Position error 0 pulse
Output voltage 0 V
Moment of inertia 8.80 kgm2X1e-4
Z position 1228 pulse
Regenerative resistor ratio 0 %
Terminal condition
Input Condition Output Condition
SON 0 SRD / Y(00) 0
RS 0 ALM / Y(01) 1
MOD / PRS1 / X(00) 0 INP / Y(02) 0
TL / X(01) 0 SA / AL1 / Y(03) 0
FOT / X(02) 0 SZD / Y(04) 1
ROT / X(03) 0 BRK / Y(05) 0
SS1 / EGR2 / X(04) 0 TLM / AL2 / Y(06) 0
SS2 / ECLR / X(05) 0 OL1 / AL3 / Y(07) 0
PPI / GCH / X(06) 0
SRZ / EGH / X(07) 0
ORL / X(08) 0
ORG / PRS2 / X(09) 0
PEN / FWD / X(10) 0
CER / REV / X(11) 0
Status information
Operation condition Operation control mode
Drive prohibition(3) Speed control (1)
No Factor Speed cmd(min-1) Speed(min-1) Amps(A) Volt(V) Input terminal Output terminal
1 Nothing 0 0 0.0 0 00000000000000 00000000
2 Nothing 0 0 0.0 0 00000000000000 00000000
3 Nothing 0 0 0.0 0 00000000000000 00000000
4 Nothing 0 0 0.0 0 00000000000000 00000000
Communication condition :Normal

3.2.2 Description of the monitoring function window

The figure below describes the monitoring function:

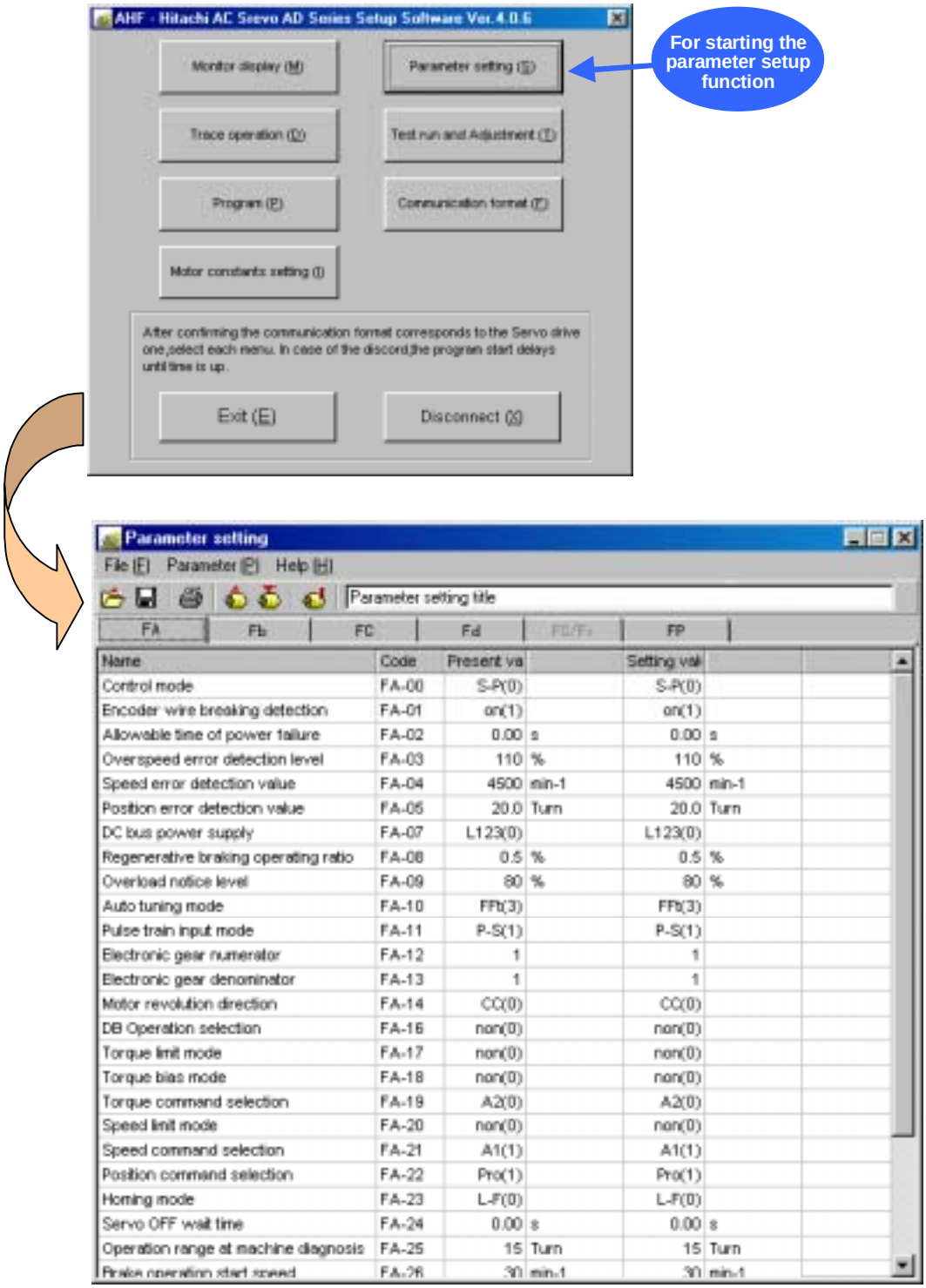

Displays the operation information in real time.
Displays the input terminal status in real time (0: OFF; 1: ON).
Displays the output terminal status in real time (0: OFF; 1: ON).
Monitor display
File (F) Help (H)
Operation information
Speed command 0 min-1
Speed detection 0 min-1
Output current 0 %
Torque command 0 %
Output torque 0 %
Position command 0 pulse
Present position 0 pulse
Position error 0 pulse
Output voltage 0 V
Moment of inertia 8.80 kgm2X1e-4
Z position 1228 pulse
Regenerative resistor ratio 0 %
Terminal condition
Input
Output
SON
SRD / Y(00)
RS
ALM / Y(01)
MOD / PRB1 / X(00)
INP / Y(02)
TL / X(01)
SA / AL1 / Y(03)
FOT / X(02)
SZD / Y(04)
ROT / X(03)
BRK / Y(05)
SS1 / EGR2 / X(04)
TLM / AL2 / Y(06)
SS2 / ECLR / X(05)
OL1 / AL3 / Y(07)
PPI / GCH / X(06)
SRZ / EOH / X(07)
ORL / X(08)
ORG / PRB2 / X(09)
PEN / FWD / X(10)
CER / REV / X(11)
Status information
Operation condition
Operation control mode
Drive prohibition(3)
Speed control (1)
No
Factor
Speed cmd(min-1)
Speed(min-1)
Amps(A)
Volt(V)
Input terminal
Output terminal
1 Nothing 0 0 0.0 0 000000000000000 00000000
2 Nothing 0 0 0.0 0 000000000000000 00000000
3 Nothing 0 0 0.0 0 000000000000000 00000000
4 Nothing 0 0 0.0 0 000000000000000 00000000
condition :Normal
Furnishes the information about operation by indicating that the servo drive is stopped, being operated, cannot be driven, cannot be driven forward, or cannot be driven backward.
Shows the current operation control mode.
Shows a trip history. The higher the number, the older the event.

3.3 Parameter Setup Function

You can use the parameter setup function to set and manage the servo drive parameters.

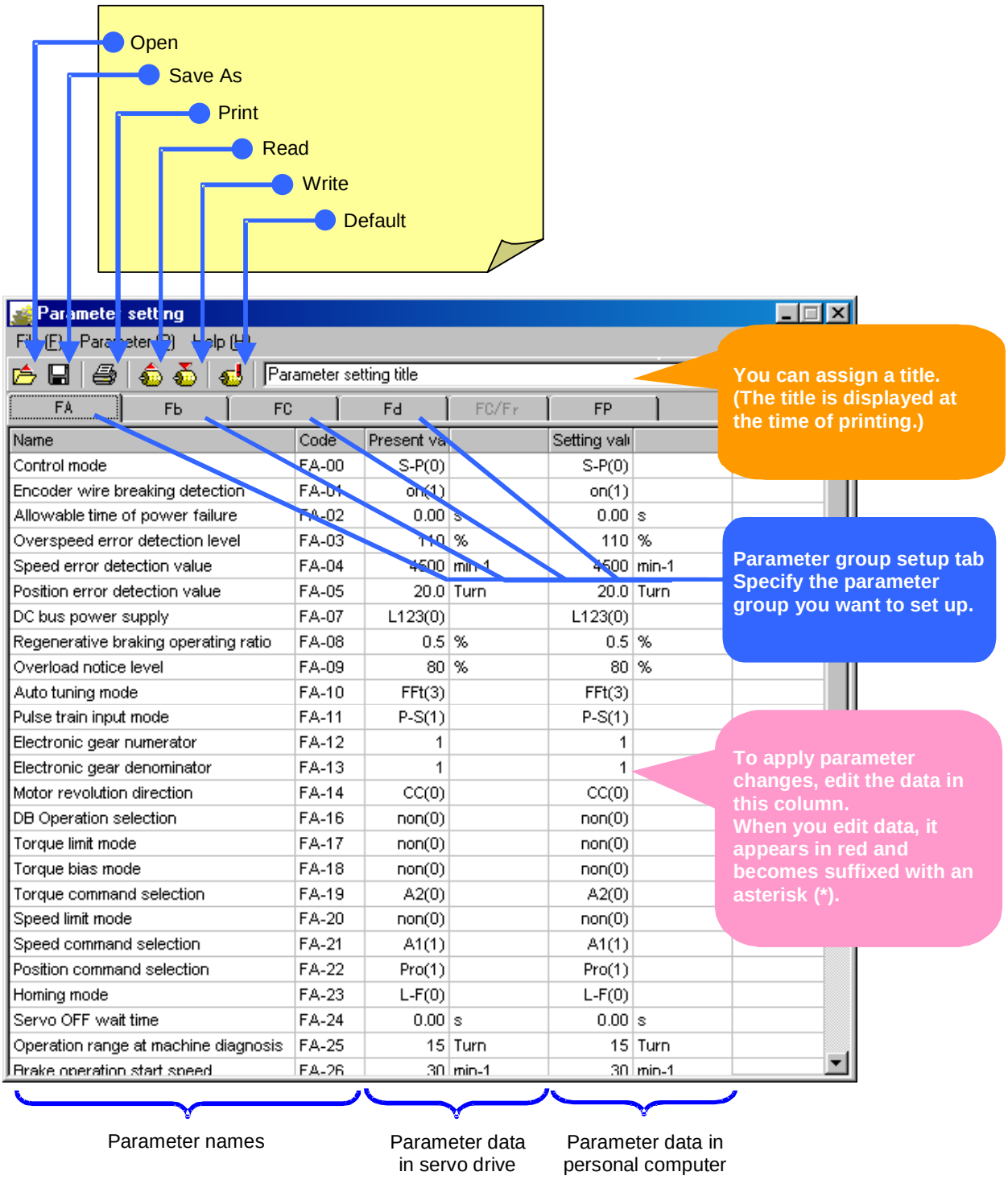
3.3.1 Starting the parameter setup function

In the opening window, click the [Parameter setting (S)] button. The following window then opens:


AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (D)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
For starting the parameter setup function
Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FE/Ff FP
Name Code Present va Setting val
Control mode FA-00 S-P(0) S-P(0)
Encoder wire breaking detection FA-01 on(1) on(1)
Allowable time of power failure FA-02 0.00 s 0.00 s
Overspeed error detection level FA-03 110 % 110 %
Speed error detection value FA-04 4500 min-1 4500 min-1
Position error detection value FA-05 20.0 Turn 20.0 Turn
DC bus power supply FA-07 L123(0) L123(0)
Regenerative braking operating ratio FA-08 0.5 % 0.5 %
Overload notice level FA-09 80 % 80 %
Auto tuning mode FA-10 FFb(3) FFb(3)
Pulse train input mode FA-11 P-S(1) P-S(1)
Electronic gear numerator FA-12 1 1
Electronic gear denominator FA-13 1 1
Motor revolution direction FA-14 CC(0) CC(0)
DB Operation selection FA-16 non(0) non(0)
Torque limit mode FA-17 non(0) non(0)
Torque bias mode FA-18 non(0) non(0)
Torque command selection FA-19 A2(0) A2(0)
Speed limit mode FA-20 non(0) non(0)
Speed command selection FA-21 A1(1) A1(1)
Position command selection FA-22 Pro(1) Pro(1)
Homing mode FA-23 L-F(0) L-F(0)
Servo OFF wait time FA-24 0.00 s 0.00 s
Operation range at machine diagnosis FA-25 15 Turn 15 Turn

3.3.2 Description of the parameter setup window

The contents of the parameter setup window are shown below:


Open
Save As
Print
Read
Write
Default
Parameter setting title
You can assign a title. (The title is displayed at the time of printing.)
Parameter group setup tab Specify the parameter group you want to set up.
To apply parameter changes, edit the data in this column. When you edit data, it appears in red and becomes suffixed with an asterisk (*).
FA
Fb
FC
Fd
FC/Fr
FP
Name
Code
Present va
Setting vali
Control mode FA-00 S-P(0) S-P(0)
Encoder wire breaking detection FA-01 on(1) on(1)
Allowable time of power failure FA-02 0.00 s 0.00 s
Overspeed error detection level FA-03 110 % 110 %
Speed error detection value FA-04 4500 min-1 4500 min-1
Position error detection value FA-05 20.0 Turn 20.0 Turn
DC bus power supply FA-07 L123(0) L123(0)
Regenerative braking operating ratio FA-08 0.5 % 0.5 %
Overload notice level FA-09 80 % 80 %
Auto tuning mode FA-10 FFt(3) FFt(3)
Pulse train input mode FA-11 P-S(1) P-S(1)
Electronic gear numerator FA-12 1 1
Electronic gear denominator FA-13 1 1
Motor revolution direction FA-14 CC(0) CC(0)
DB Operation selection FA-16 non(0) non(0)
Torque limit mode FA-17 non(0) non(0)
Torque bias mode FA-18 non(0) non(0)
Torque command selection FA-19 A2(0) A2(0)
Speed limit mode FA-20 non(0) non(0)
Speed command selection FA-21 A1(1) A1(1)
Position command selection FA-22 Pro(1) Pro(1)
Homing mode FA-23 L-F(0) L-F(0)
Servo OFF wait time FA-24 0.00 s 0.00 s
Operation range at machine diagnosis FA-25 15 Turn 15 Turn
Brake operation start speed FA-26 30 min-1 30 min-1
Parameter names
Parameter data in servo drive
Parameter data in personal computer

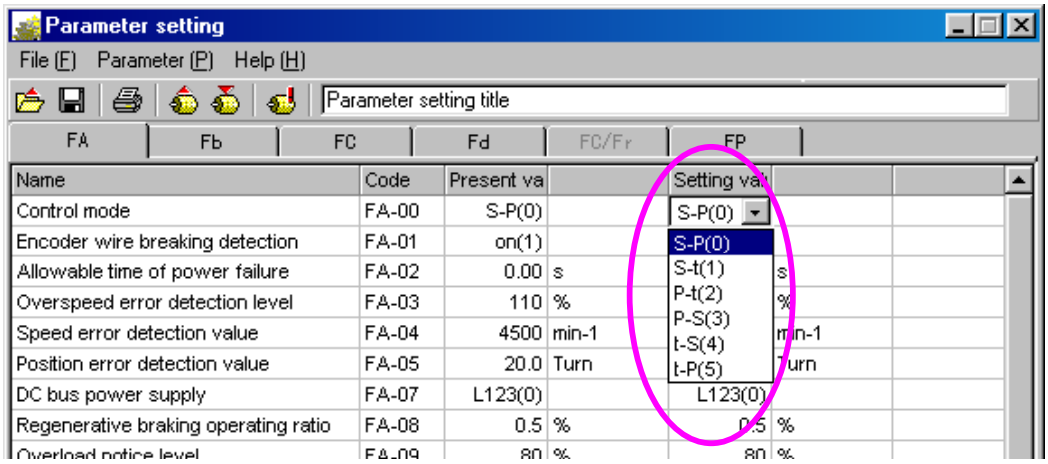
3.3.3 Editing the parameters

Two examples are presented in this section to explain about the parameter editing procedure.

- Choosing from a drop list --- Example 1) Editing FA-00
- Inputting value directly --- Example 2) Editing Fb-00

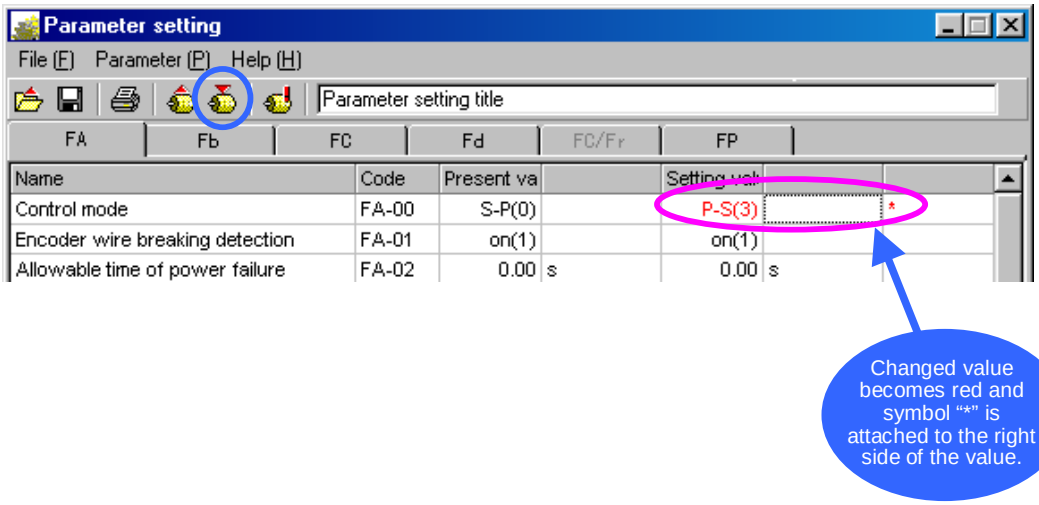
(Example 1) Editing FA-00

1- Choose the FA tab, click the mouse on the FA-00 setting field, and select a new setting from the drop-down menu.


Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name Code Present va Setting va
Control mode FA-00 S-P(0) S-P(0)
Encoder wire breaking detection FA-01 on(1)
Allowable time of power failure FA-02 0.00 s
Overspeed error detection level FA-03 110 %
Speed error detection value FA-04 4500 min-1
Position error detection value FA-05 20.0 Turn
DC bus power supply FA-07 L123(0) L123(0)
Regenerative braking operating ratio FA-08 0.5 %
S-P(0)
S-t(1)
P-t(2)
P-S(3)
t-S(4)
t-P(5)

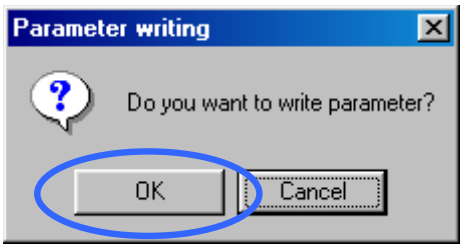
Note 1) (0) showed after S-P means the value used in the servo drive internally.
Note 2) An error occurs on the screen when an attempt is made to rewrite write-protected parameters while an operation is performed with the SON terminal turned on.

2- Verify that the newly selected setting is displayed in red.

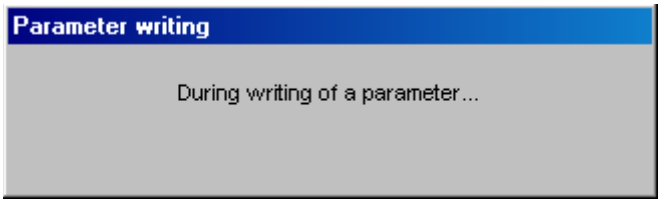

Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name Code Present va Setting va
Control mode FA-00 S-P(0) P-S(3) *
Encoder wire breaking detection FA-01 on(1) on(1)
Allowable time of power failure FA-02 0.00 s 0.00 s
Changed value becomes red and symbol "*" is attached to the right side of the value.

3- Choose [Parameter (P)] on the menu bar and then choose [Write (W)], or click the mouse on on the toolbar.

4- When the following dialog box opens, choose [OK].



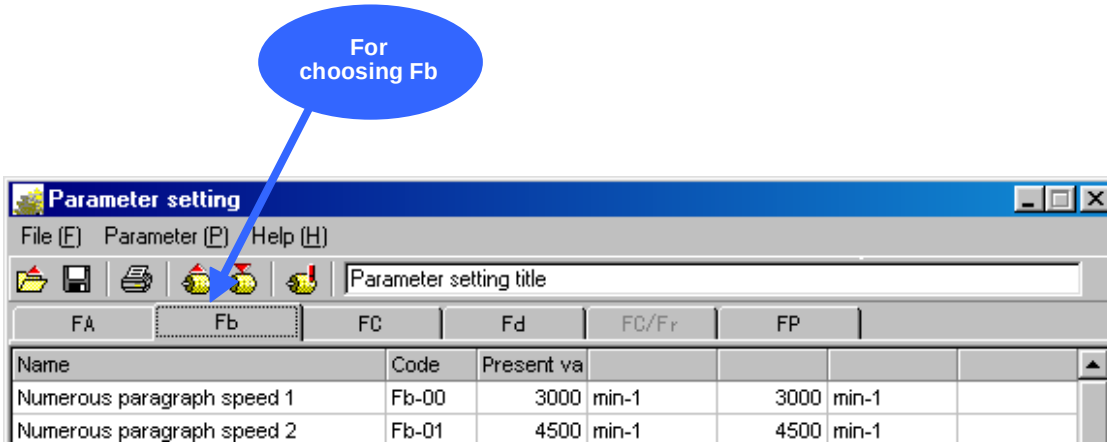
5- The following message then appears to indicate that a parameter write is in progress.



6- In case of finishing rewriting parameters, red value becomes black and symbol “*” attached to the right side of the value is disappeared.

(Example 2) Editing Fb-00

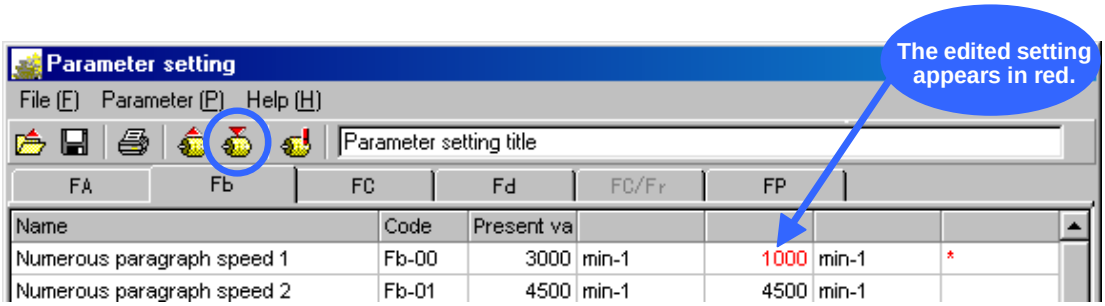
1- Choose the Fb tab, click the mouse on the Fb-00 setting field, and enter a new setting.


For choosing Fb
Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name Code Present va
Numerous paragraph speed 1 Fb-00 3000 min-1 3000 min-1
Numerous paragraph speed 2 Fb-01 4500 min-1 4500 min-1

Note 1) An error occurs on the screen when an attempt is made to rewrite write-protected parameters while an operation is performed with the SON terminal turned on.

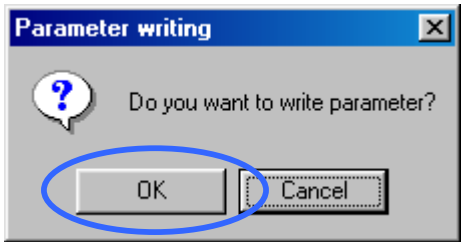
Note 2) An error occurs on the screen when an attempt is made to write parameter data that is outside the acceptable parameter range.

2- Verify that the newly entered setting is displayed in red.

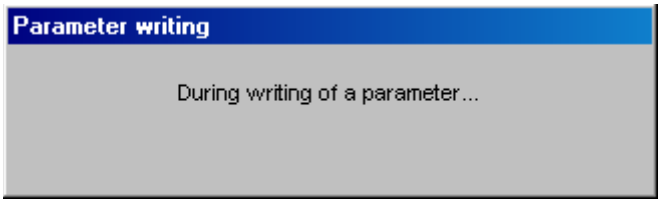

The edited setting appears in red.
Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name Code Present va
Numerous paragraph speed 1 Fb-00 3000 min-1 1000 min-1 *
Numerous paragraph speed 2 Fb-01 4500 min-1 4500 min-1

3- Choose [Parameter (P)] on the menu bar and then choose [Write (W)], or click the mouse on on the toolbar.

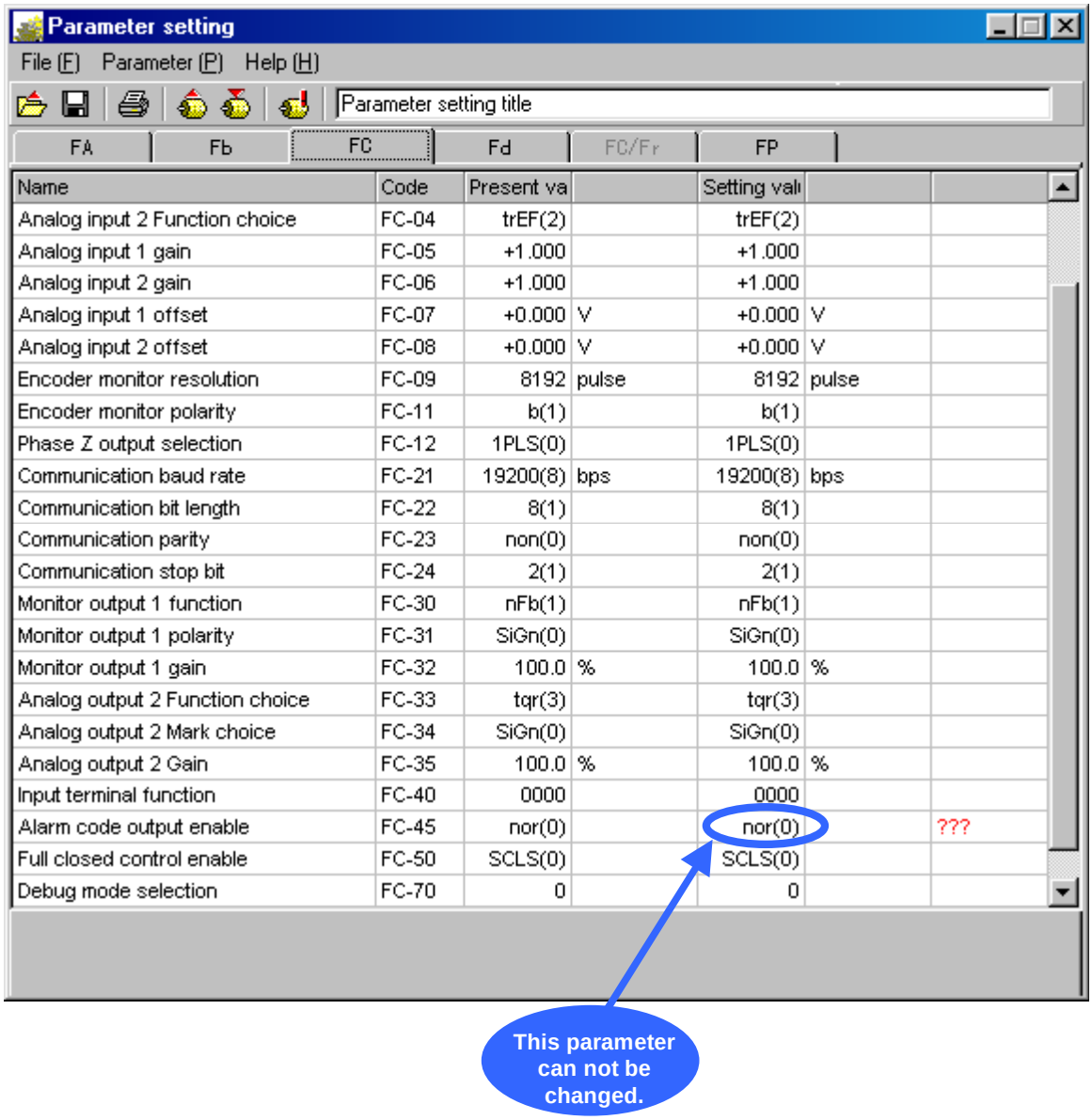
4- When the following dialog box opens, choose [OK].



5- The following message then appears to indicate that a parameter write is in progress.



6- In case of finishing rewriting parameters, red value becomes black and symbol “*” attached to the right side of the value is disappeared.


Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name | Code | Present va | | Setting val | | |
Analog input 2 Function choice | FC-04 | trEF(2) | | trEF(2) | | |
Analog input 1 gain | FC-05 | +1.000 | | +1.000 | | |
Analog input 2 gain | FC-06 | +1.000 | | +1.000 | | |
Analog input 1 offset | FC-07 | +0.000 | V | +0.000 | V | |
Analog input 2 offset | FC-08 | +0.000 | V | +0.000 | V | |
Encoder monitor resolution | FC-09 | 8192 | pulse | 8192 | pulse | |
Encoder monitor polarity | FC-11 | b(1) | | b(1) | | |
Phase Z output selection | FC-12 | 1PLS(0) | | 1PLS(0) | | |
Communication baud rate | FC-21 | 19200(8) | bps | 19200(8) | bps | |
Communication bit length | FC-22 | 8(1) | | 8(1) | | |
Communication parity | FC-23 | non(0) | | non(0) | | |
Communication stop bit | FC-24 | 2(1) | | 2(1) | | |
Monitor output 1 function | FC-30 | nFb(1) | | nFb(1) | | |
Monitor output 1 polarity | FC-31 | SiGn(0) | | SiGn(0) | | |
Monitor output 1 gain | FC-32 | 100.0 | % | 100.0 | % | |
Analog output 2 Function choice | FC-33 | tqr(3) | | tqr(3) | | |
Analog output 2 Mark choice | FC-34 | SiGn(0) | | SiGn(0) | | |
Analog output 2 Gain | FC-35 | 100.0 | % | 100.0 | % | |
Input terminal function | FC-40 | 0000 | | 0000 | | |
Alarm code output enable | FC-45 | nor(0) | | nor(0) | | ??? |
Full closed control enable | FC-50 | SCLS(0) | | SCLS(0) | | |
Debug mode selection | FC-70 | 0 | | 0 | | |
This parameter can not be changed.

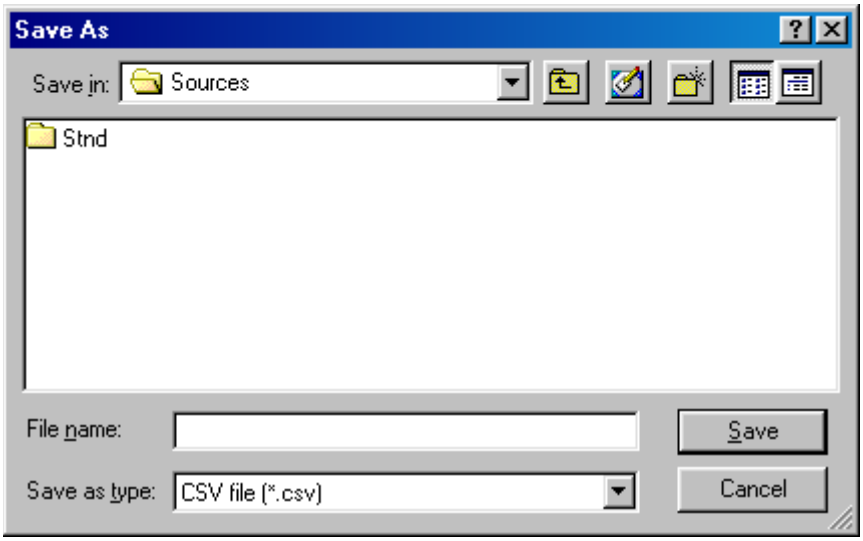
NOTE 3: You cannot edit the parameters displayed in the parameter setup window if the red "???" mark is displayed to the right of their settings.

NOTE 4: Do not turn off the servo drive control power while a parameter write is in progress. If it turns off during a parameter write, the EEPROM data in the servo drive may become damaged, causing the servo drive to improperly operate.

3.3.4 Saving the parameters

You can save the parameters in a file for parameter management purposes.

1- In the parameter setup window, choose [File (F)] on the menu bar and then choose [Save As (S)], or click the mouse on on the toolbar.



2- When the Save As window opens, specify the file name and save destination.
You can save the file in either of the following two different formats:
CSV: Saves the file in a comma-separated value form.
TXT: Saves the file in a tab-separated value form.
(AHF cannot read the file saved in TXT form.)

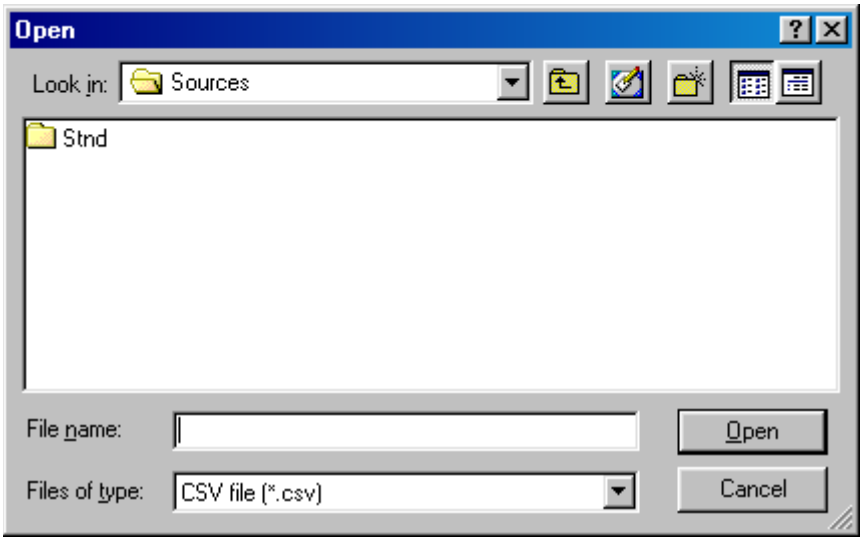
NOTE: The data saved in this manner is not the servo drive data but the personal computer data (data displayed in the current value column). If you save the data without completing the write procedure, the saved data differs from the data in the servo drive.

With this function, you can create different data files beforehand without writing data into the servo drive.

3.3.5 Loading the parameters

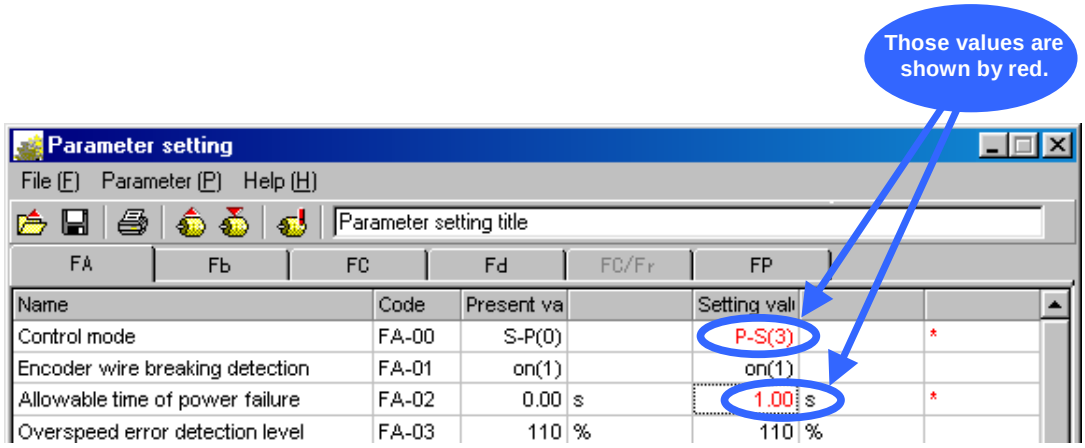
A file saved in a manner described in the preceding section can be used to set up the parameters.

1- In the parameter setup window, choose [File (F)] on the menu bar and then choose [Open (O)], or click the mouse on on the toolbar.



2- When the Open window opens, specify the name of the file to load and its storage location.
Note, however, that only CSV files can be loaded.

3- After the parameters are loaded from the specified file, the parameter data is displayed in red as shown below if its value for the personal computer differs from its value for the servo drive.


Those values are shown by red.
Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name Code Present va Setting val
Control mode FA-00 S-P(0) P-S(3) *
Encoder wire breaking detection FA-01 on(1) on(1)
Allowable time of power failure FA-02 0.00 s 1.00 s *
Overspeed error detection level FA-03 110 % 110 %

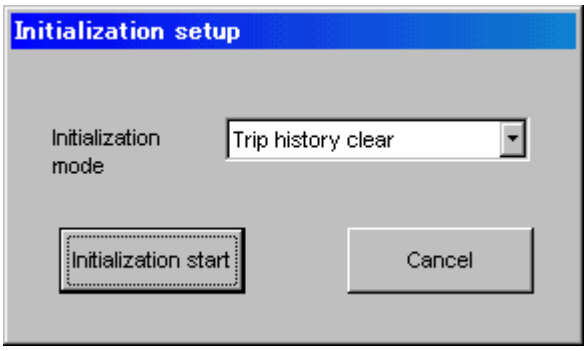
Write the data as needed into the servo drive.

3.3.6 Reverting to factory default

You can revert to the factory default parameter settings. You can use this feature if, for instance, the parameters are improperly set due to an operating error. This operation can be done by pull-down menu.

1- In the parameter setup window, choose [Parameter (P)] on the menu bar and then choose [Initialization (I)], or click the mouse on on the toolbar.

2- When the following setup window opens, specify the initialization mode and default data type.
The following initialization modes and default data types are selectable:
Initialization modes
Trip history clear: Clears the trip history only.
Data initialization: Clears the parameter data only.
Encoder zero clear: Clears the absolute value encoder's multi-rotation data only.
(One- and smaller-rotation data must be managed by the host system.)



3- Click the initialization start button to start the initialization process.
While the initialization process is in progress, the servo drive LED indicator reads as indicated below:

Trip history clear	→	HC
Default data for Japan	→	JP
Encoder zero clear	→	AbSC

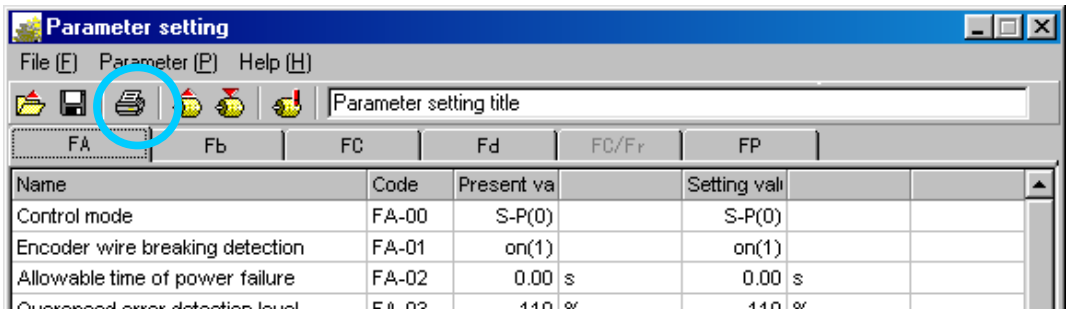
4- After completion of initialization, the personal computer automatically reads the data from the servo drive to conclude the initialization process.

NOTE: Do not turn off the servo drive control power during initialization. If it turns off during a write, the EEPROM data in the servo drive may become damaged, causing the servo drive to improperly operate.

3.3.7 Printing the parameters

You can print out parameter data to compile a report.

1- In the parameter setup window, choose [File (F)] on the menu bar and then choose [Print (P)], or click the mouse on on the toolbar.

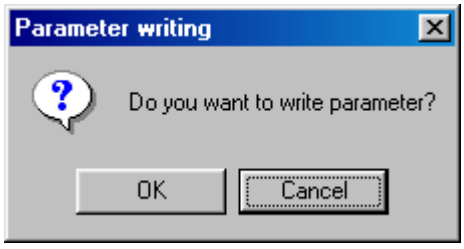

Parameter setting
File (F) Parameter (P) Help (H)
Parameter setting title
FA Fb FC Fd FC/Fr FP
Name Code Present va Setting val
Control mode FA-00 S-P(0) S-P(0)
Encoder wire breaking detection FA-01 on(1) on(1)
Allowable time of power failure FA-02 0.00 s 0.00 s

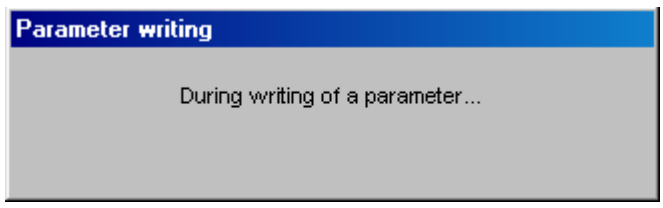
2- When the printer setup window opens, enter appropriate setup data to print out the parameters.

3.3.8 Copying the parameters

You can copy the parameters from one servo drive unit to another by performing the following procedure:

1- As directed earlier under "Saving the parameters", save in a file the parameters for the servo drive at the copy source.
2- Exit Setup Software AHF and then turn off the personal computer and servo drive.
3- Connect the RS-232C cable to the servo drive at the copy destination.
4- Turn on the personal computer and servo drive.
5- Start Setup Software AHF. As directed earlier under "Loading the parameters", load the parameters from the file to the personal computer.
6- As directed earlier under "Editing the parameters", verify that the changed data settings are displayed in red, and choose [Parameter (P)] from the menu bar and then choose [Write (W)], or click the mouse on on the toolbar.
7- When the parameters are properly written, the following messages appear.





NOTE1: Do not turn off the servo drive control power during a parameter write. If it turns off during the parameter write, the EEPROM data in the servo drive may become damaged, causing the servo drive to improperly operate.

NOTE2: An error occurs on the screen when an attempt is made to write parameter data that is outside the acceptable parameter range or to rewrite write-protected parameters while an operation is performed with the SON terminal turned on.

3.4 Operation Trace Function

This function enables you to visually confirm the servo drive operation. The table below shows the traceable items and control states.

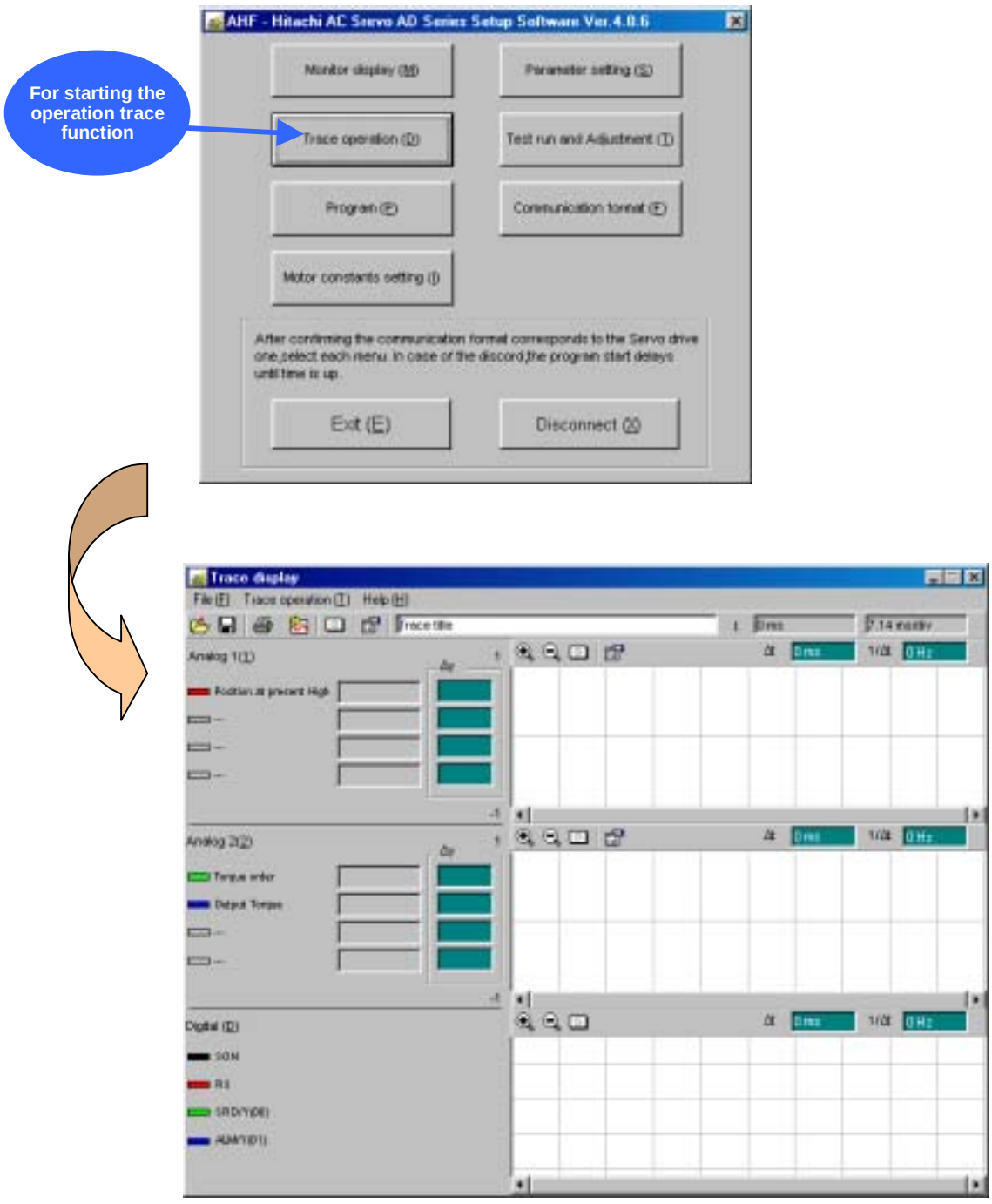
Trace items

Trace type	Resolution (number of points)		Trace item	Description	Data update intervals	Traceable operation control mode		
	Time axis	Vertical axis				Position	Speed	Torque
Analog graph 1 /graph 2	512	65535	Speed command	Traces the speed command from the position controller or analog input or other speed command.	140µs	1	4	x
			Detected speed value	Traces the detected speed value at all times.	140µs	3	3	3
			Output current	Traces the peak value of the current supplied from the servo drive to the servomotor.	4ms	1	1	1
			Torque command	Traces the torque current command from the speed controller or analog input or other torque current command.	140µs	1	1	4
			Output torque	Traces the torque current value.	140µs	2	2	2
			Position command high order	Traces the high-order portion of the position controller's position command (32768 dig = 1 rotation).	140µs	○	x	x
			Position command low order	Traces the low-order portion of the position controller's position command (32768 dig = 1 rotation).	140µs	○	x	x
			Current position high order	Traces the high-order portion of the current position (32768 dig = 1 rotation).	140µs	2	2	2
			Current position low order	Traces the low-order portion of the current position (32768 dig = 1 rotation).	140µs	2	2	2
			Position error high order	Traces the high-order portion of the position controller's position error (32768 dig = 1 rotation).	140µs	1	x	x
			Position error low order	Traces the low-order portion of the position controller's position error (32768 dig = 1 rotation).	140µs	1	x	x
			Output voltage	Traces the execution value of the voltage supplied from the servo drive to the servomotor.	40ms	1	1	1
Digital		2 points	All input terminals	Traces all the input terminals.	Approx. 1 ms	○	○	○
			All output terminals	Traces all the output terminals.	Approx. 1 ms	○	○	○

Traceable control states
○: Traceable at all times
1: Traceable (0 output at the time of a trip)
2: Traceable (undefined at the time of a trip)
3: Traceable (0 output when the encoder is abnormal)
4: Traceable (0 output at the time of a trip except for analog command input)
x: 0 output at all times

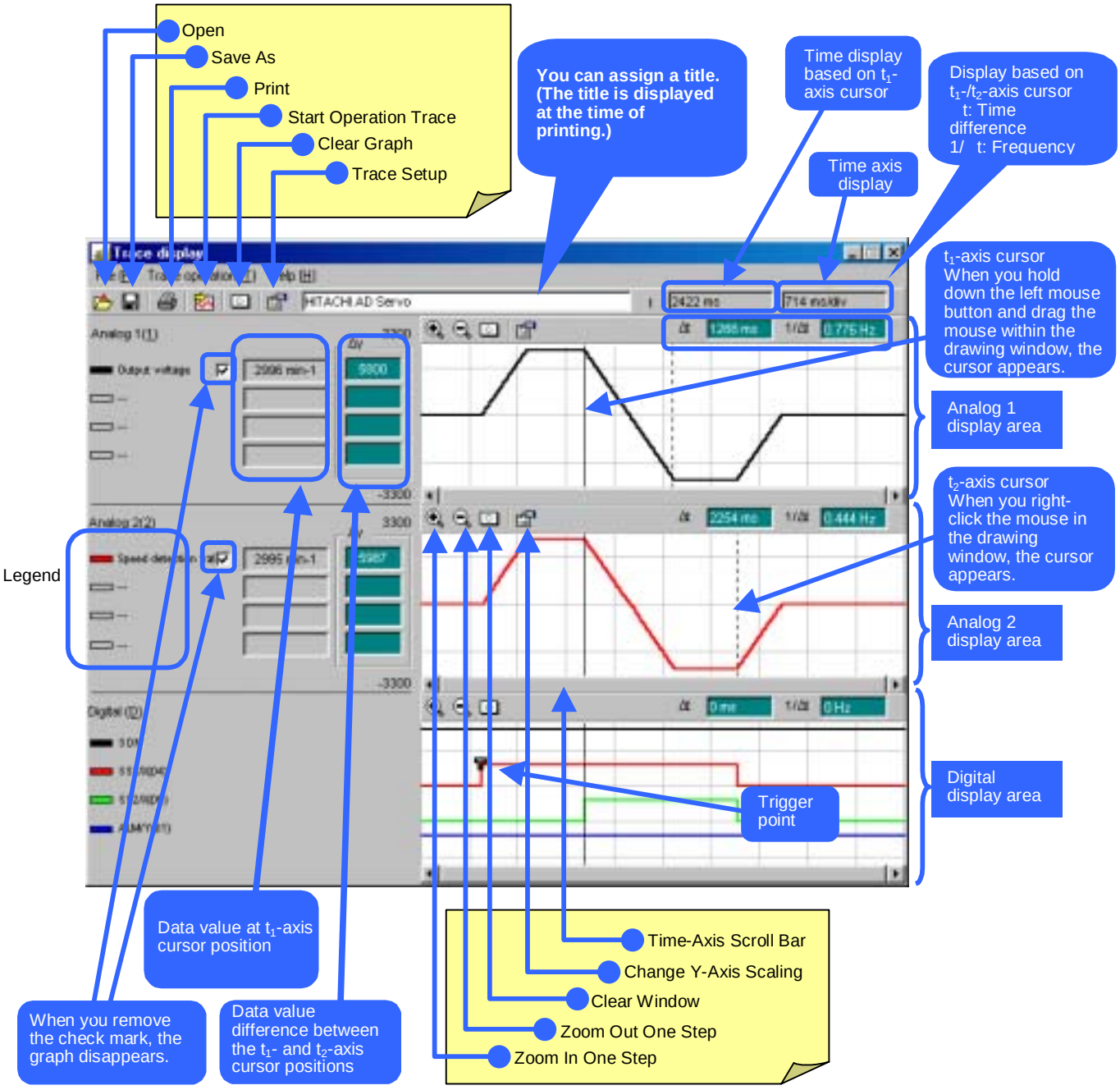
3.4.1 Starting the operation trace function

The operation trace window opens when you click the [Trace operation (D)] button in the opening window.


For starting the operation trace function
AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (D)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
Trace display
File (F)
Trace operation (T)
Help (H)
Analog 1 (1)
Analog 2 (2)
Digital (D)

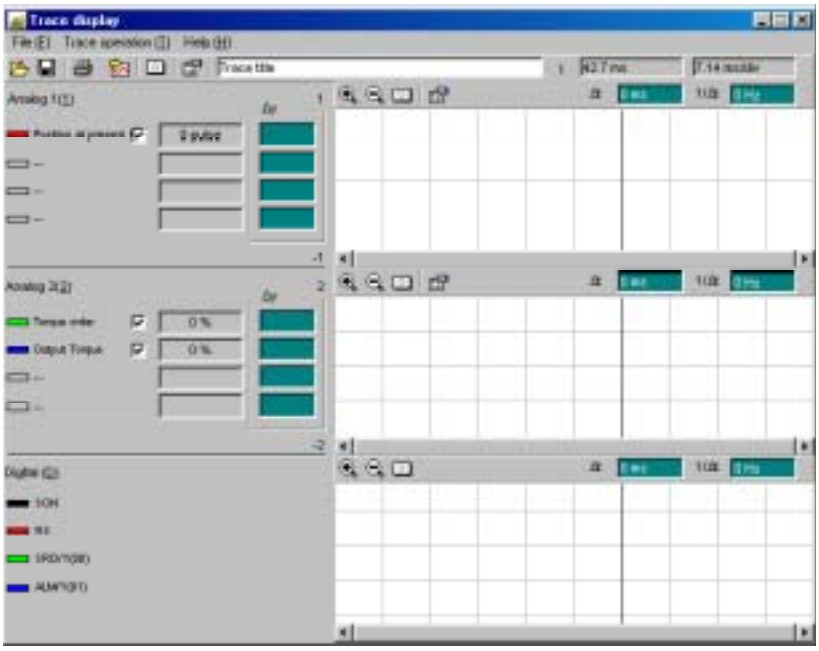
3.4.2 Description of the operation trace window

The figure below describes the contents of the operation trace window:

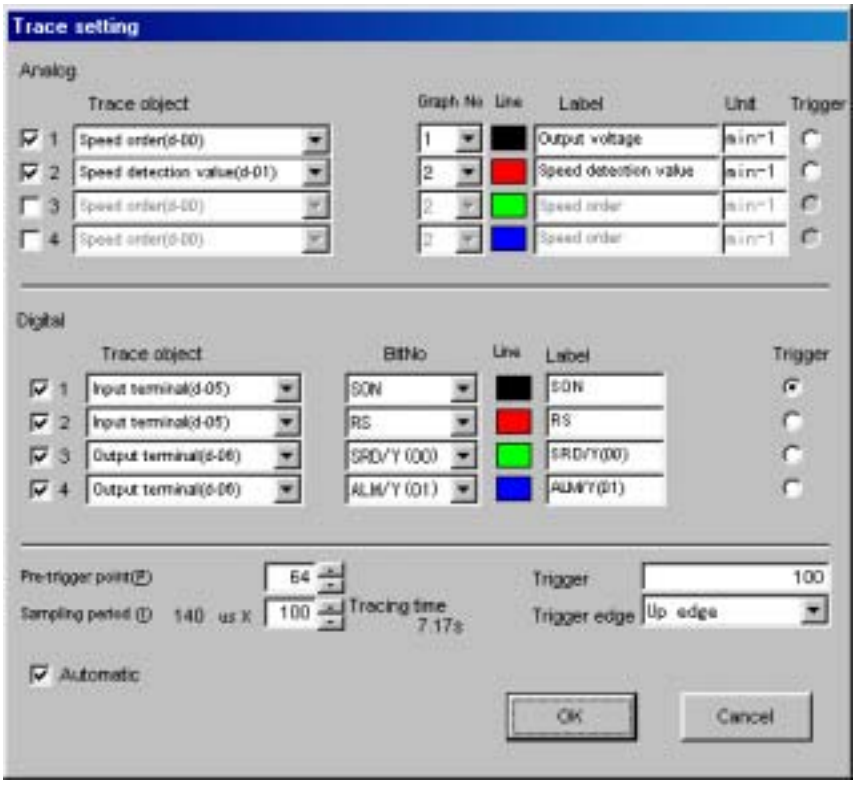

Open
Save As
Print
Start Operation Trace
Clear Graph
Trace Setup
You can assign a title. (The title is displayed at the time of printing.)
Time display based on t1-axis cursor
Time axis display
Display based on t1-/t2-axis cursor
t: Time difference
1/ t: Frequency
t1-axis cursor When you hold down the left mouse button and drag the mouse within the drawing window, the cursor appears.
Analog 1 display area
t2-axis cursor When you right-click the mouse in the drawing window, the cursor appears.
Analog 2 display area
Digital display area
Trigger point
Legend
Data value at t1-axis cursor position
When you remove the check mark, the graph disappears.
Data value difference between the t1- and t2-axis cursor positions
Time-Axis Scroll Bar
Change Y-Axis Scaling
Clear Window
Zoom Out One Step
Zoom In One Step

3.4.3 Operation trace sequence

1- Open the operation trace window.

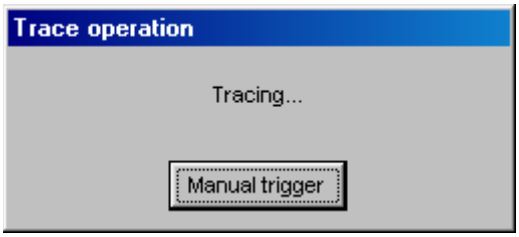


2- Perform trace setup (see the next page for the setup procedure).
To do this, choose [Trace operation (T)] on the menu bar and then choose [Trace setting (O)], or click on the toolbar.



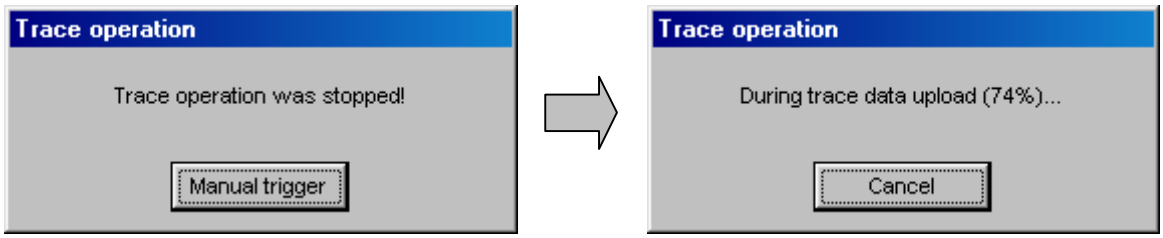
After completion of trace setup, click [OK].

3- Start an operation trace.
To do this, choose [Trace operation (T)] on the menu bar and then choose [Trace Start (S)], or click on the toolbar.



When an operation trace starts, the above message appears.

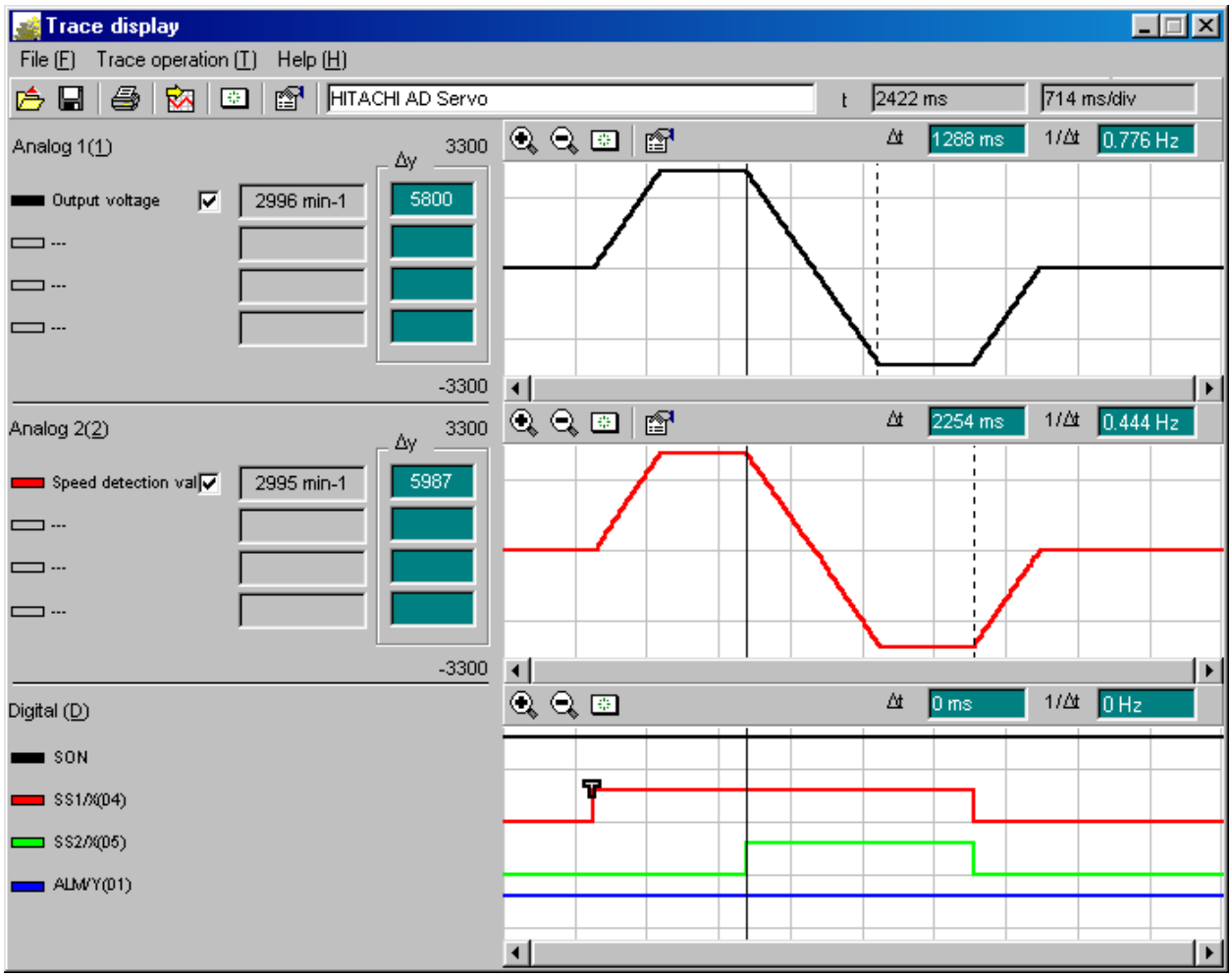
4- When you click the trigger condition button or [Manual trigger] button in the above dialog box, the servo drive transfers data to the personal computer and the following dialog box opens.



NOTE1: Since the sampling cycle is short, the screen of “Trace operation was stopped!” may not appear.

NOTE2: If you click the cancel button from the above dialog box, no graph will be drawn.

5- Upon completion of data transfer, the data appears as shown below.



3.4.4 Operation trace setup

The trace setup window can be opened as directed below:
Choose [Trace operation (T)] on the menu bar and then choose [Trace setting (O)], or click on the toolbar.

After completion of setup, click [OK].

(1) Analog trace setup procedure

1- Check the channels to be validated (by entering a check mark in the associated check boxes). Up to four channels of analog data can be traced.

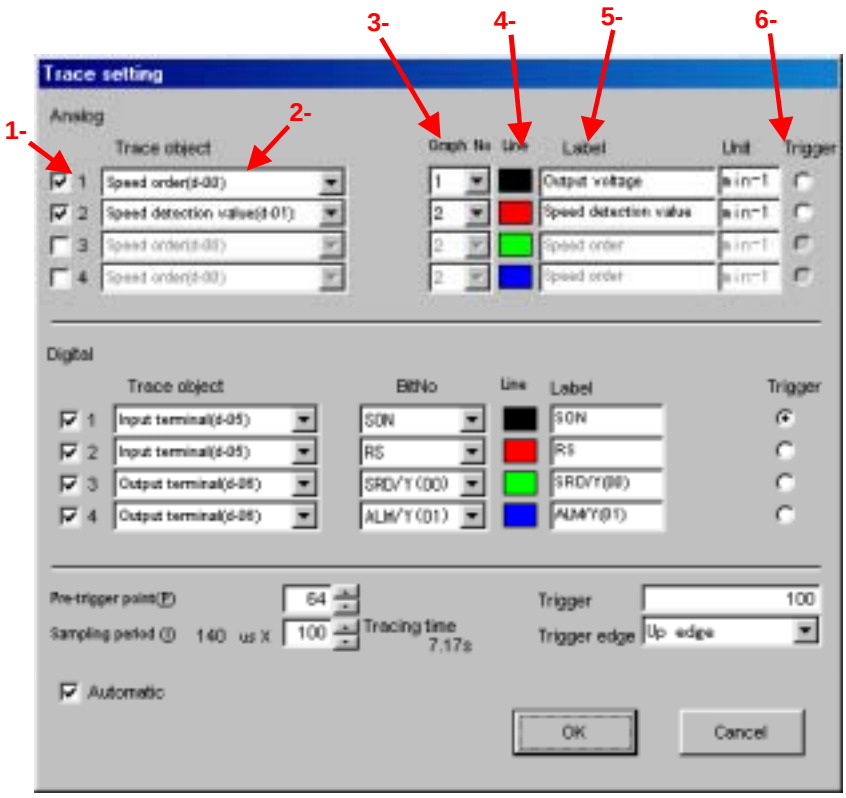
2- From the drop-down menu, choose a trace target.
Refer to [3.4 Operation Trace Function] about the candidate for trace.

3- Select a display graph number (1 or 2) (No.1 is displayed in the area 1 and No.2 is displayed in the area 2.).

4- Displayed color is selectable.

5- Label name is changeable by inputting directly.

6- Check the channel for triggering.



(2) Digital trace setup procedure

1- Check the channels to be validated (by entering a check mark in the associated check boxes). Up to four channels of digital contacts can be traced.

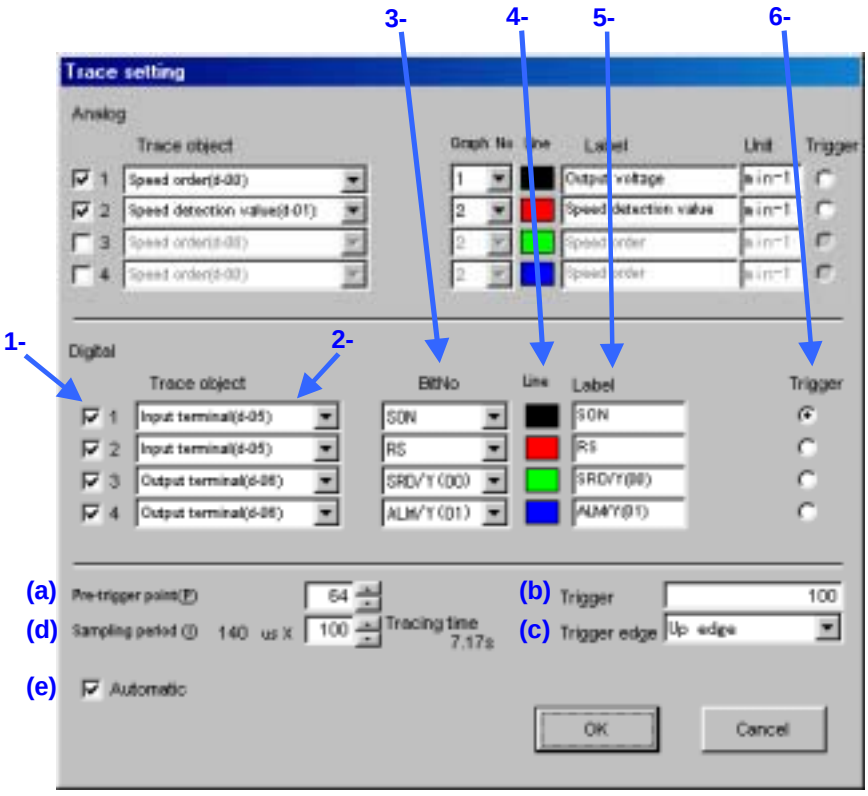
2- From the drop-down menu, choose a trace target.
(All input / output terminal data is selectable as the candidate for trace. Refer to [3.4 Operation Trace Function].)

3- From the drop-down menu, choose the name of the terminal to be traced.
(All input / output terminal data is selectable as the candidate for trace. Refer to [3.4 Operation Trace Function].)

4- Specify the display color.

5- Enter a graph label name.

6- Check the channel for triggering.



(3) Other setup

(a)Pre-trigger points: Data can be displayed beginning with a position that precedes the triggering point. Make this entry to specify such a position.

(b)Trigger: Enter a trigger level (this entry is valid for an analog trace only).

(c)Trigger edge: Specify the trigger edge.

(d)Sampling period: Specify the sampling intervals. Data will be sampled at the specified intervals for display purposes. The maximum trace time (time during which a trace can be performed) is displayed to the right of the sampling interval setting.

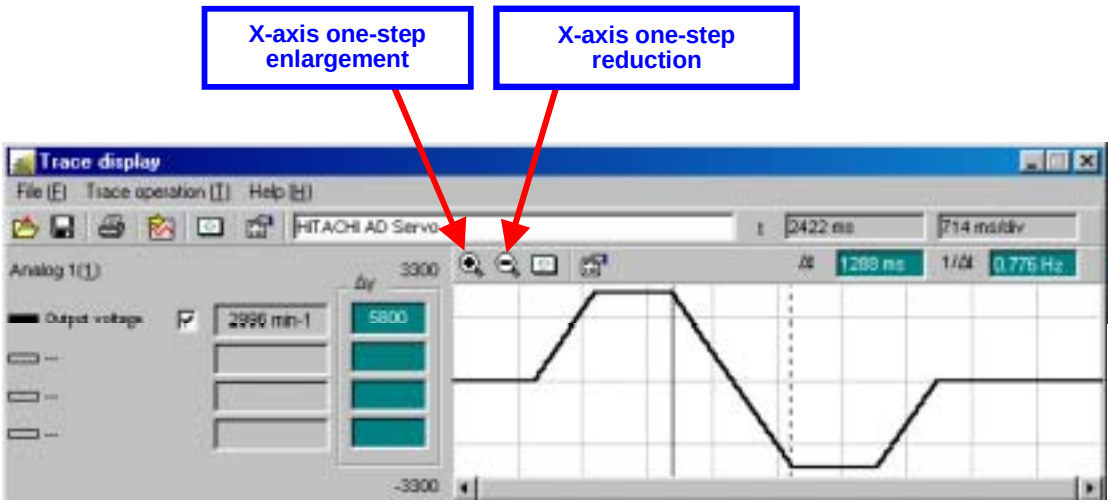
(e)Automatic: Check this option when you want to optimize the Y-axis scale in accordance with the sampled data.

After completion of entire setup, click [OK] to close the window.

3.4.5 Graph display setup

(1) X-axis setup procedure

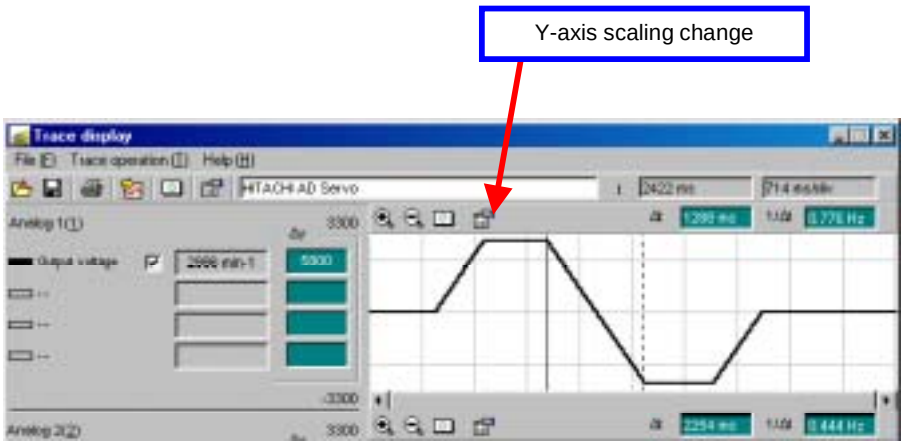
With the toolbar near a graph axis, you can enlarge the X-axis or revert to the standard size of each graph axis. Use the following toolbar buttons.



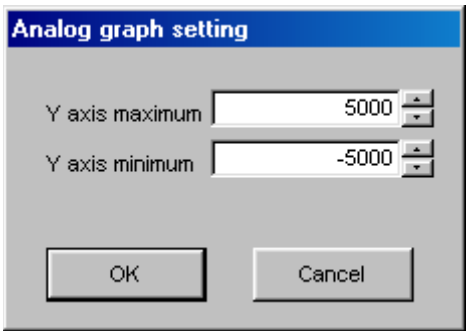
(2) Y-axis setup procedure

With the toolbar near a graph axis, you can change the Y-axis scale.

To change the Y-axis scale, click the following toolbar button.

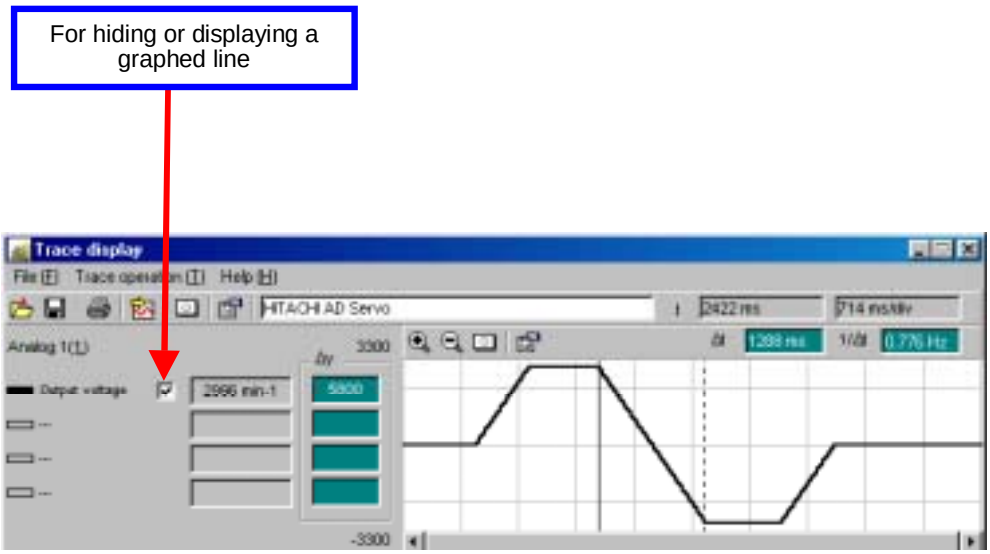


The following window then opens. In the open window, enter scaling values and then click the [OK] button. The graph is then redrawn in accordance with the specified scaling values.



(3) Hiding a graphed line

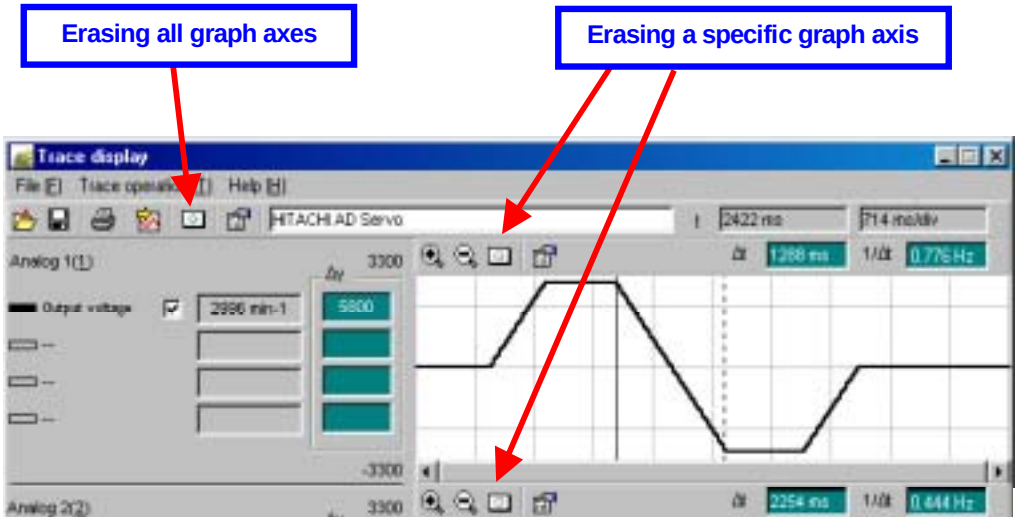
You can hide a graphed line by removing the associated check mark as indicated below. To redisplay the graphed line, put a check mark back in the check box.



(4) Clearing the contents of the window

You can erase the on-screen graph by choosing [Trace operation (T)] on the menu bar and then choosing [Clear display (C)], or click on the toolbar.

You can also use the following toolbar buttons to erase the entire contents of the window or individual graphs.



3.5 Test Run and Adjustment Functions

This section describes the functions that are useful for a test run.

3.5.1 Jogging and homing

With the personal computer, you can start a jog operation or return the servomotor to its home for test run purposes.

< Jog operation>

The jog operation function can be exercised to check the servo drive, servomotor, power supply, or other wiring. (For the use of the jog operation function, no external I/O wiring connection is necessary.)

(1) Jog operation procedures

Two different jog operations are available: normal jogging and pulse train based jogging. Normal jogging is conducted in the speed control mode, whereas pulse train based jogging is conducted in the position control mode with a preselected number of pulses fed. Both of these jog operations are described below.

(1-A) Jog operation procedure

This operation is performed according to a given speed command until the stop command is received.

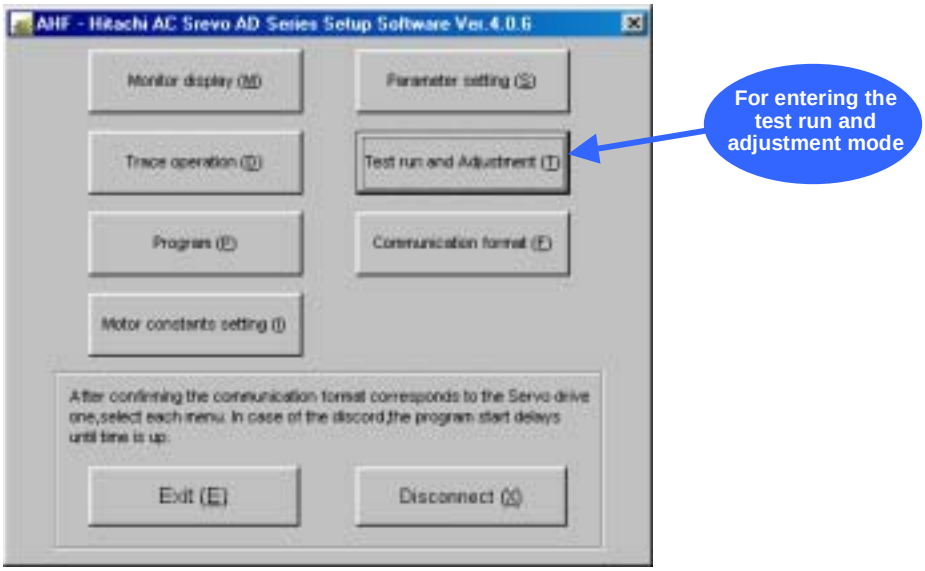
NOTE 1: While this operation is being conducted, do not enter a signal from the SON terminal or other I/O connector. If such a signal enters, the operation is performed in compliance with it.

NOTE 2: This jog operation is performed at an acceleration/deceleration time setting of 0 s and in accordance with the currently selected control gain, speed limiter, and other settings.

The procedure is described below:

1- In the opening window, click the [Test run and Adjustment (T)] button.

When the following window opens, click the Jog & homing tab.


AHF - Hitachi AC Srevo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (O)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
For entering the test run and adjustment mode

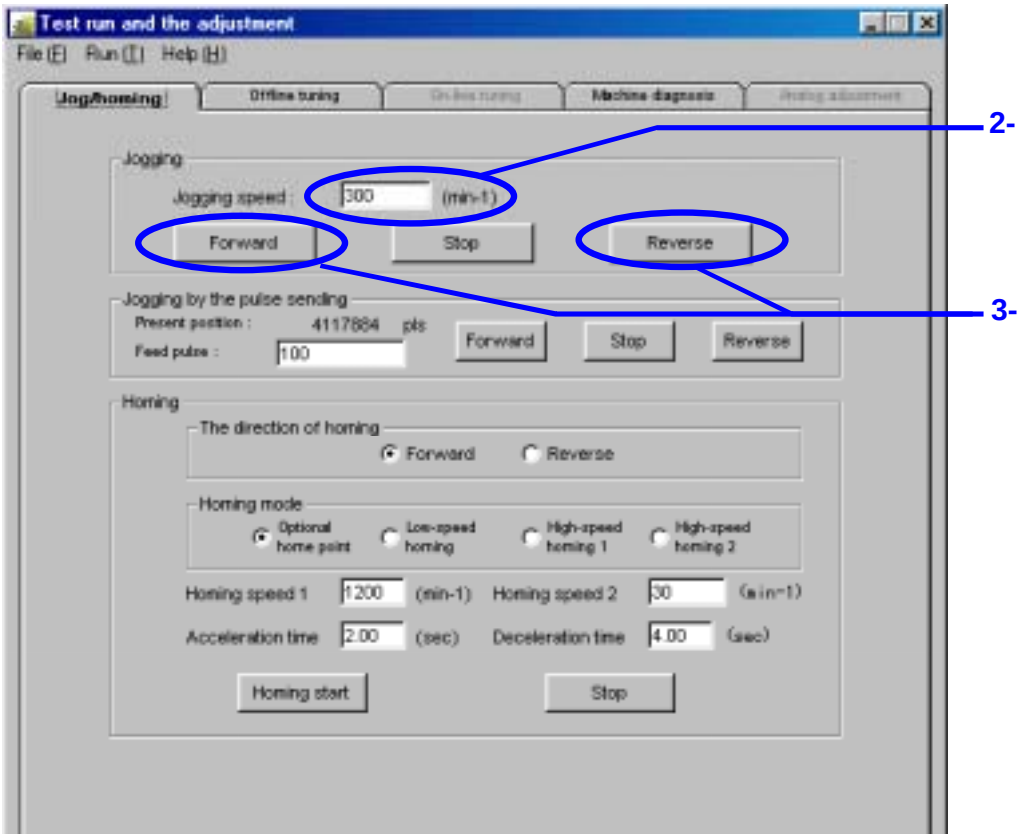
NOTE 3: If the monitor display window is open, close it beforehand.

2- Enter the speed command for jogging in field 2 below.

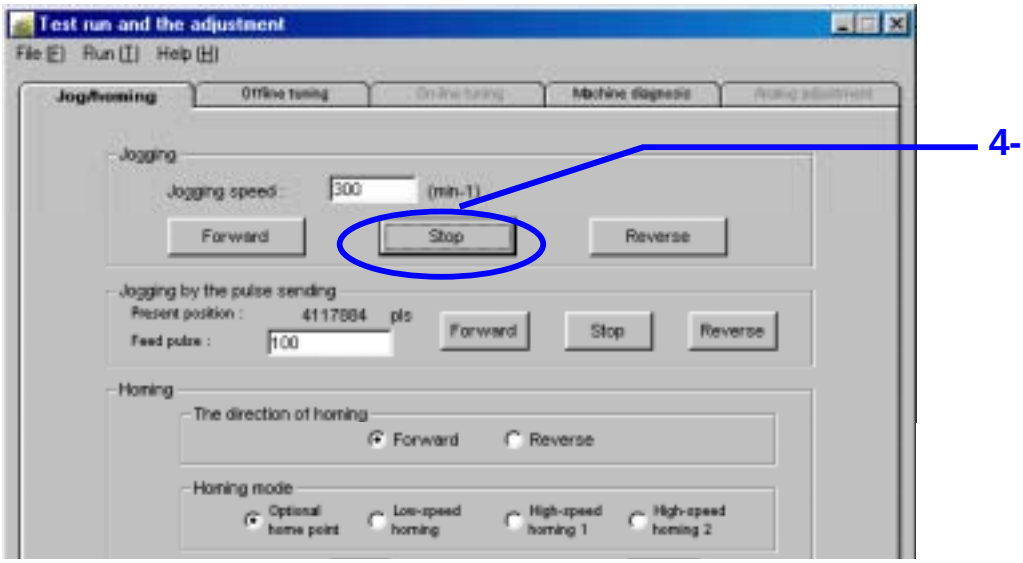
3- Conform the safety and then click a button to specify the desired direction of operation (see 3) in the figure below). (The servomotor then starts rotating in the specified direction.)

NOTE: Since this step causes the servomotor to run, confirm the safety beforehand.

Upon completion of the above step, the contents of the window change as indicated below.



4- When you click the [Stop] button, the servomotor stops (servo OFF) (see 4) in the figure below).



(1-B) Pulse feed jog operation procedure

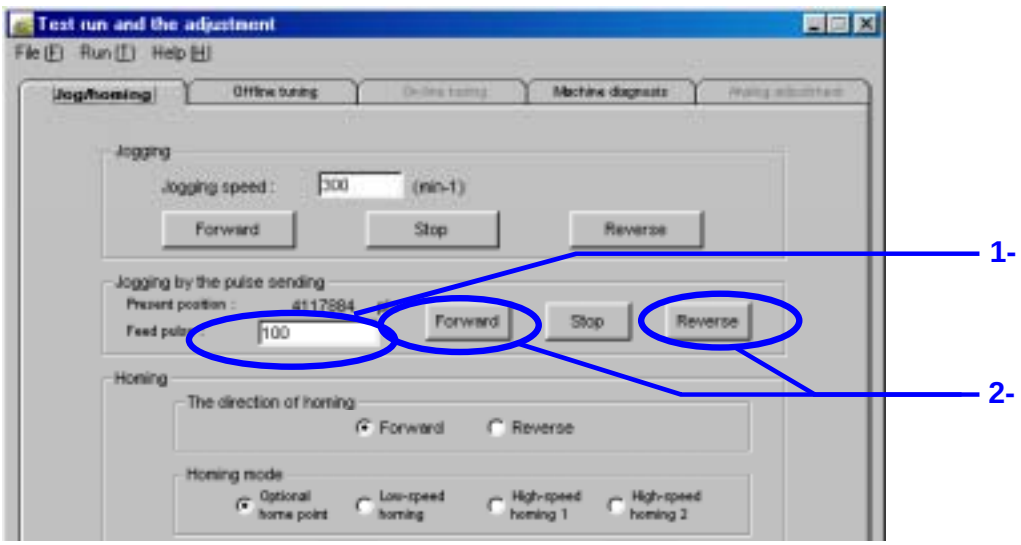
In compliance with a given position command, the pulse feed jogging operation is performed in the position control mode until the specified position is reached.

NOTE 1: While this operation is being conducted, do not enter a signal from the SON terminal or other I/O connector. If such a signal enters, the operation is performed in compliance with it.

NOTE 2: This jog operation is performed at an acceleration/deceleration time setting of 0 s and in accordance with the currently selected control gain, speed limiter, and other settings.

The procedure is described below:

1- From the following window, enter the number of feed pulses (note that one rotation is equivalent to 32768 pulses).

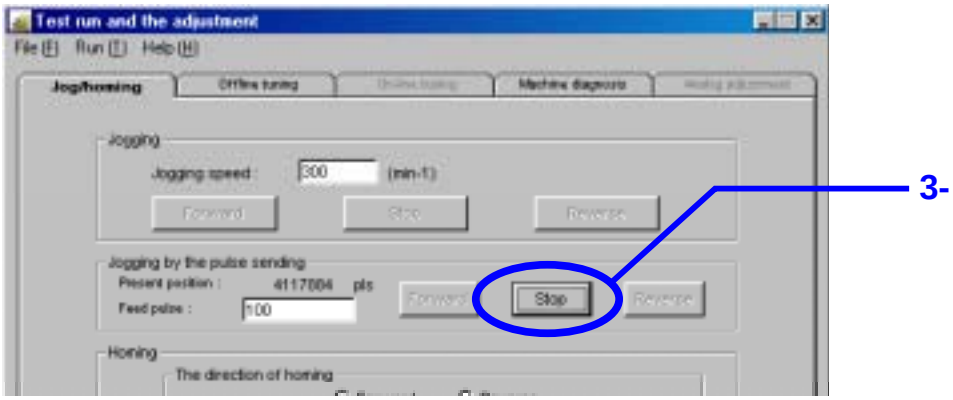


2- Enter a speed limit value (Fb-20/Fb-21) that is not higher than 300 min^{-1}. (Observe the limit to prevent the servomotor from tripping or getting out of control.)

3- Confirm the safety and then click the [Forward] or [Reverse] button (see 2) in the above figure). (The servomotor then rotates in the specified direction and becomes positioned according to the command value.)

NOTE: Since this step causes the servomotor to run, confirm the safety beforehand.

While positioning is in progress after completion of the above step, the window looks like the figure below:



To abort the positioning process (servo OFF), click the [Stop] button, which is numbered 3- in the above figure.

4- Upon completion of positioning, you are returned to the initial window.
In the resulting state, the servo ON state continues. Therefore, click the [Stop] button, which is numbered 3- in the above figure.

<Homing>

With this homing function, you can return the servomotor to its home from the personal computer.

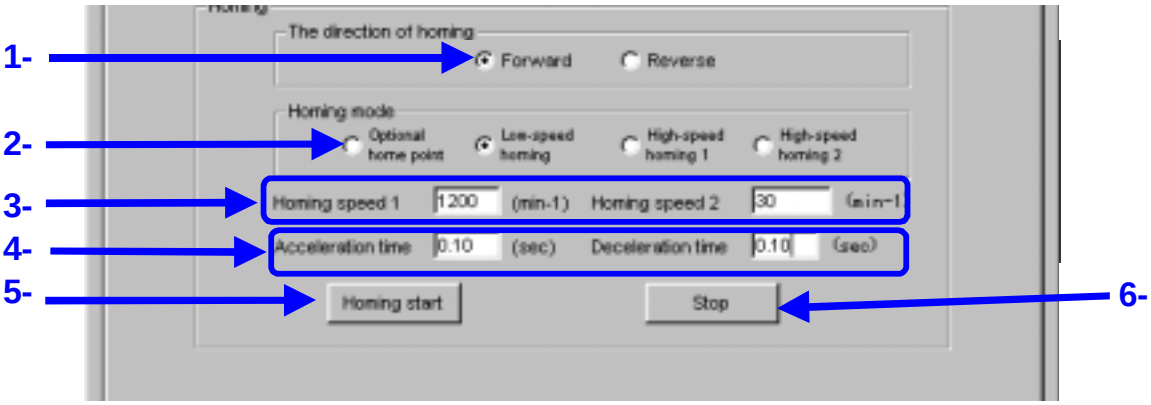
(For the use of this homing function, only the ORL terminal connection is required.)

The procedure is described below:

1- Specify the direction of homing.
2- Select a homing mode.
3- Enter a homing speed.
4- Enter an acceleration time and deceleration time.
5- Click the [Homing start] button.

Since this starts a homing operation (rotates the servomotor), confirm the safety before clicking the button.

6- To abort the homing operation, click the [Stop] button.



NOTE: For the details of the homing function, refer to the instruction manual of the AC servo drive AD Series.

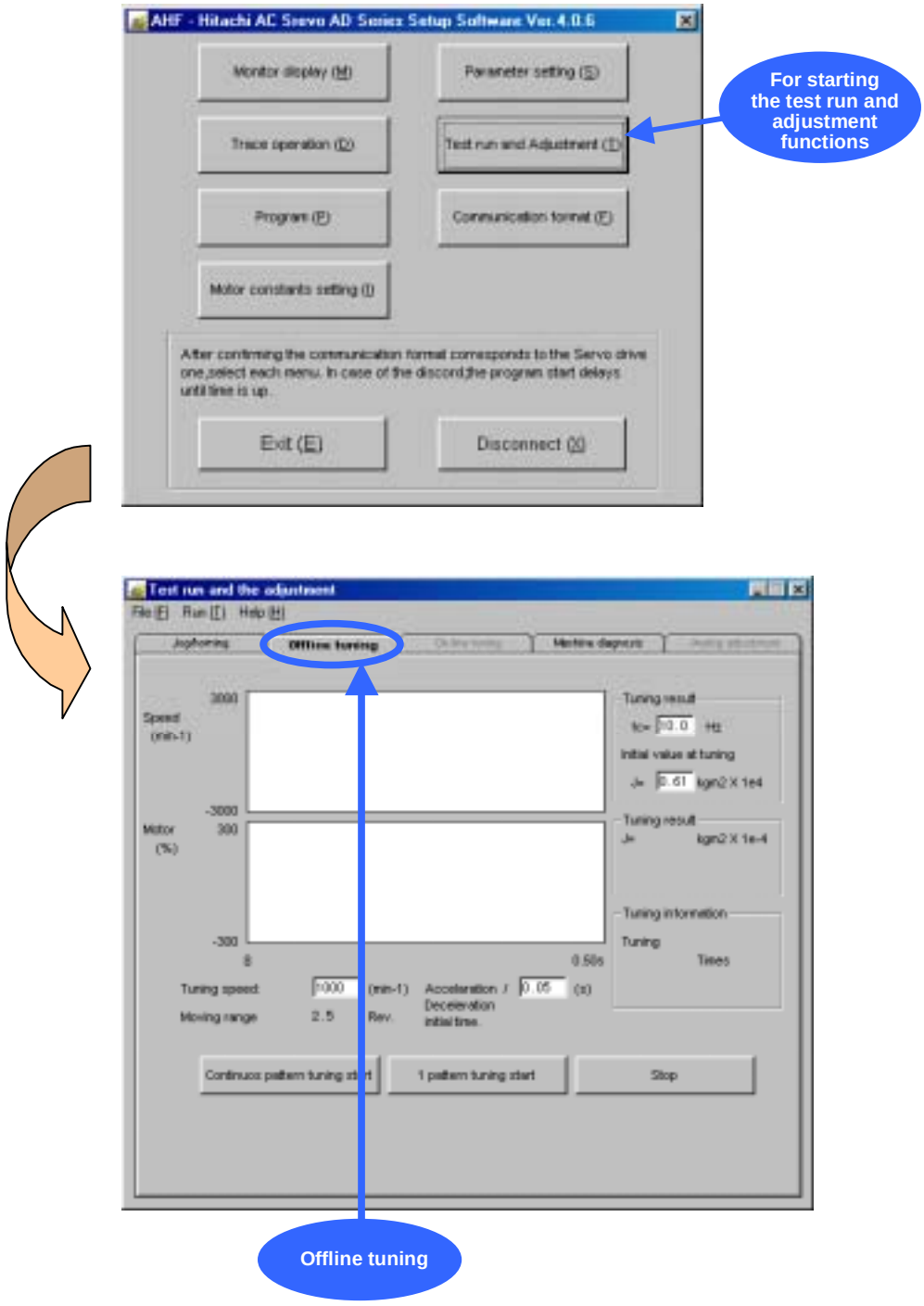
3.5.2 Off-line tuning

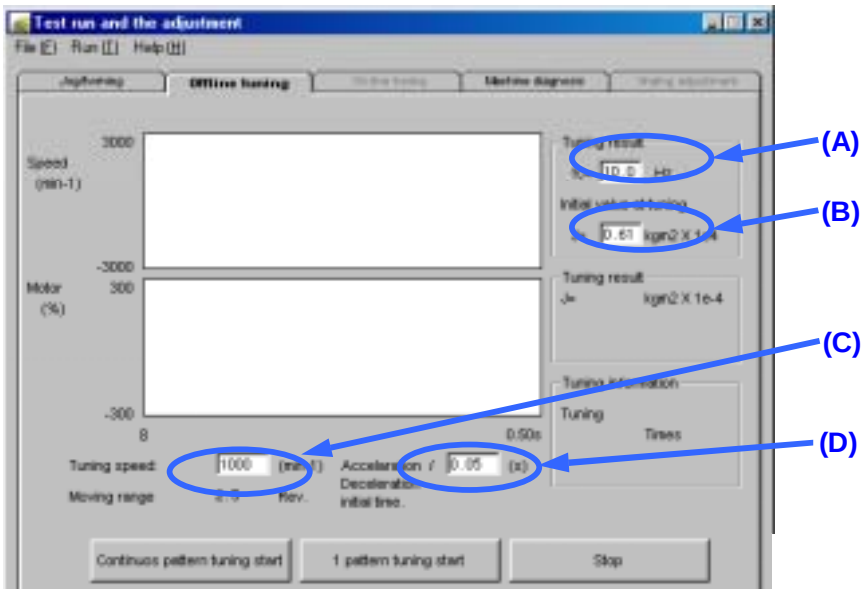
The total inertia, including the motor inertia, can be approximately calculated in the off-line state.

To exercise this function, perform either of the following procedures.

(1) Procedure for fully-automatic off-line tuning

1- In the opening window, click the [Test Run and Adjustment (T)] button. The following window then opens (click the Offline tuning tab).





2- Enter the following parameters which are required for tuning:

(A) Speed control cut-off frequency

Set the speed control cut-off frequency for off-line tuning. Enter a setting at which no hunting occurs.

(B) Tuning inertia initial value

Set the inertia for the beginning of off-line tuning. When an approximate inertia value is known, make this entry to ensure that tuning is rapidly completed. If the approximate inertia value is not known, you do not have to make this entry. If you do not make this entry, the off-line tuning function estimates the inertia.

(C) Tuning rotating speed

Enter the rotating speed for off-line tuning. If you are sure that the initial value does not damage the machine connected to the servomotor, you can use the initial setting.

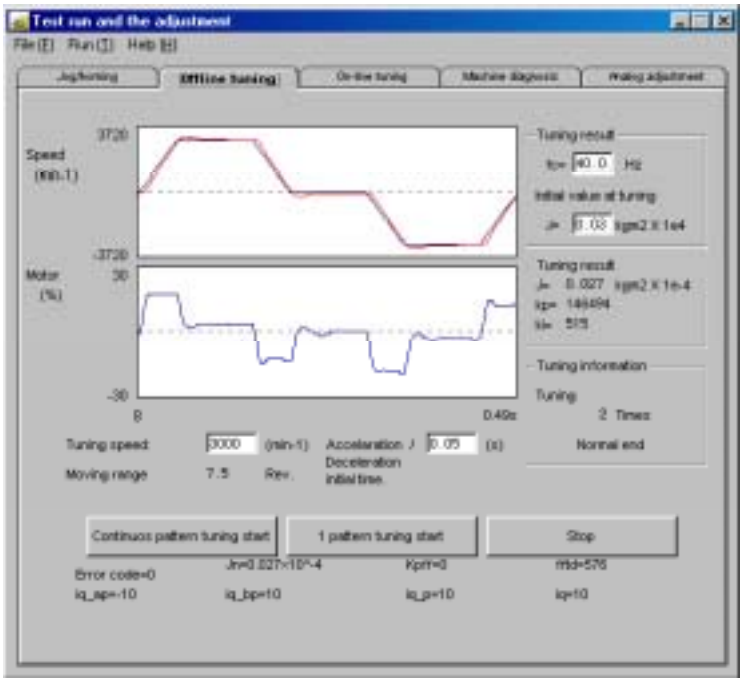
(D) Acceleration/deceleration time

Set the pattern operation acceleration/deceleration time for off-line tuning. If you are sure that the initial value does not damage the machine connected to the servomotor, you can use the initial setting.

3- Click the [Continuous pattern tuning start] button.

4- Confirm the safety, and then turn on the FOT terminal, ROT terminal, and SON terminal in order named. A pattern operation is then continuously performed to estimate the inertia.

5- After completion of inertia estimation, the operating waveform for the last pattern operation is downloaded from the servo drive to display the estimation result as indicated below:



6- After completion of tuning, be sure to finish the Auto-tuning mode by tuning SON terminal off, RS terminal on and RS terminal off.

NOTE 1: Exercising this function automatically rewrites inertia setting Fd-00.

NOTE 2: Even when the tuning process is aborted, **be sure to finish the Auto-tuning mode by turning SON terminal off, RS terminal on and RS terminal off.**

(2) Procedure for performing an off-line tuning process while verifying individual steps

1- In the opening window, click the [Test Run and Adjustment (T)] button. The following window then opens (click the Offline tuning tab).

2- Enter the following parameters which are required for tuning:

(A) Speed control cut-off frequency

Set the speed control cut-off frequency for off-line tuning. Enter a setting at which no hunting occurs.

(B) Tuning inertia initial value

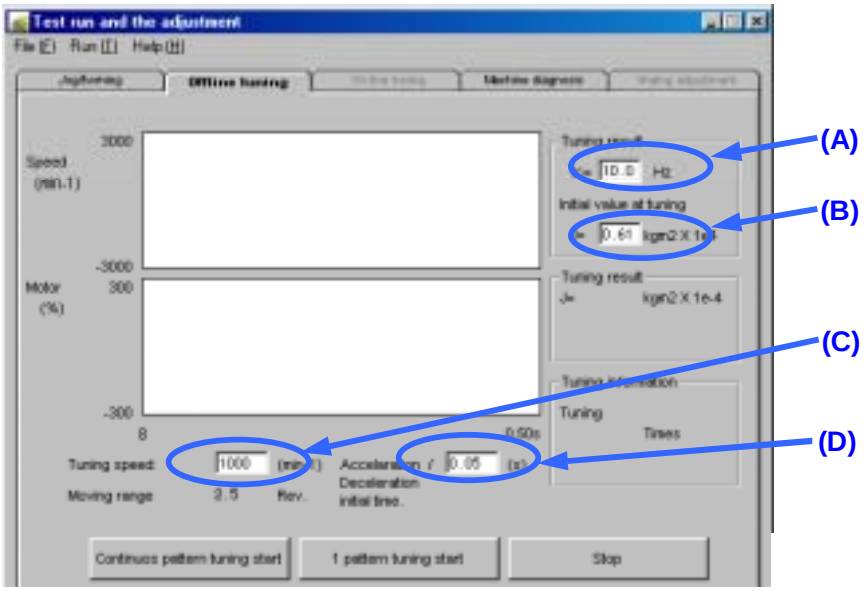
Set the inertia for the beginning of off-line tuning. When an approximate inertia value is known, make this entry to ensure that tuning is rapidly completed. If the approximate inertia value is not known, you do not have to make this entry. If you do not make this entry, the off-line tuning function estimates the inertia.

(C) Tuning rotating speed

Enter the rotating speed for off-line tuning. If you are sure that the initial value does not damage the machine connected to the servomotor, you can use the initial setting.

(D) Acceleration/deceleration time

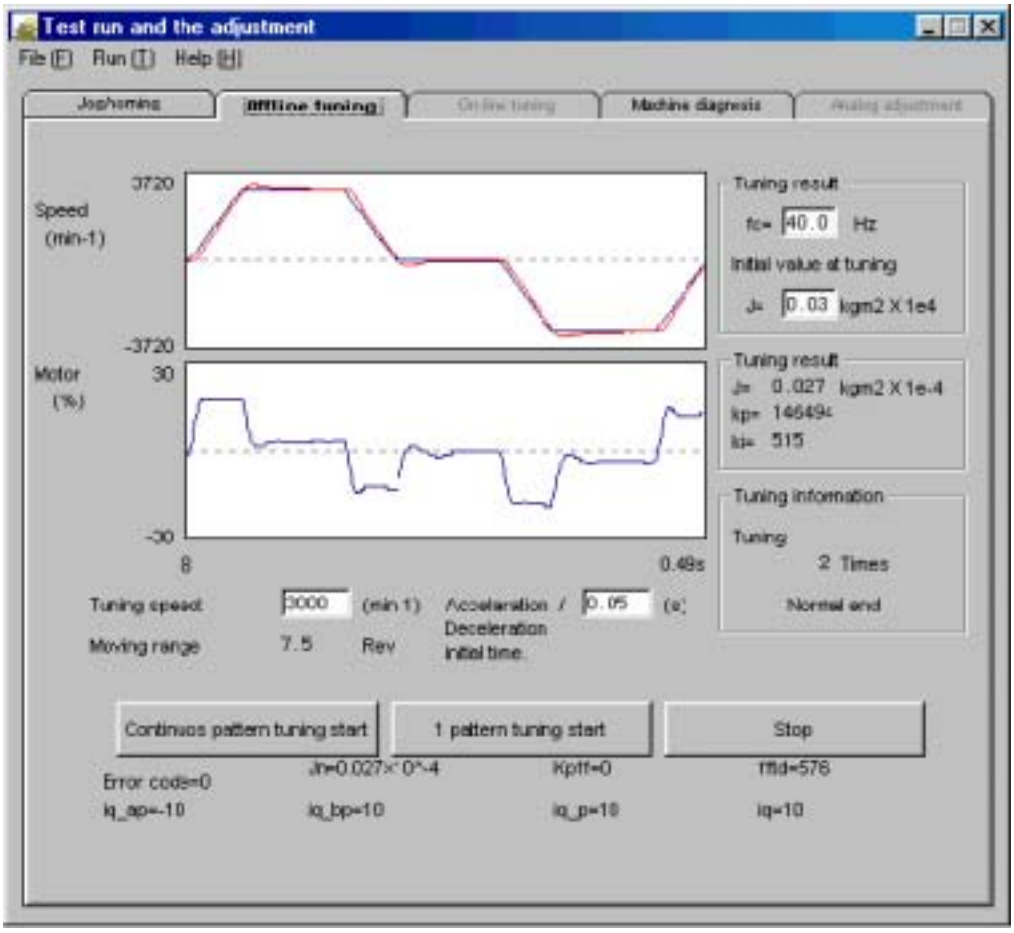
Set the pattern operation acceleration/deceleration time for off-line tuning. If you are sure that the initial value does not damage the machine connected to the servomotor, you can use the initial setting.



3- Click the [1 pattern tuning start] button.

4- Confirm the safety, and then turn on the FOT terminal, ROT terminal, and SON terminal in order named. A one-pattern operation is then performed to estimate the inertia.

5- After completion of inertia estimation, the operating waveform for the last pattern operation is downloaded from the servo drive to display the estimation result as indicated below:



6- Check whether the waveform is adequate. If necessary, you can click the [1 pattern tuning start] button again. A one-pattern operation is then performed to estimate the inertia. You can continue to perform tuning in this manner while checking the on-screen waveform each time.

7- After completion of tuning, be sure to finish the Auto-tuning mode by turning SON terminal off, RS terminal on and RS terminal off.

NOTE 1: Exercising this function automatically rewrites inertia setting Fd-00.

NOTE 2: Even when the tuning process is aborted, **be sure to finish the Auto-tuning mode by turning SON terminal off, RS terminal on and RS terminal off.**

3.5.3 Mechanical system diagnostic measurement procedure

The resonance point of the machine connected to the servomotor can be measured. The procedure is described below.

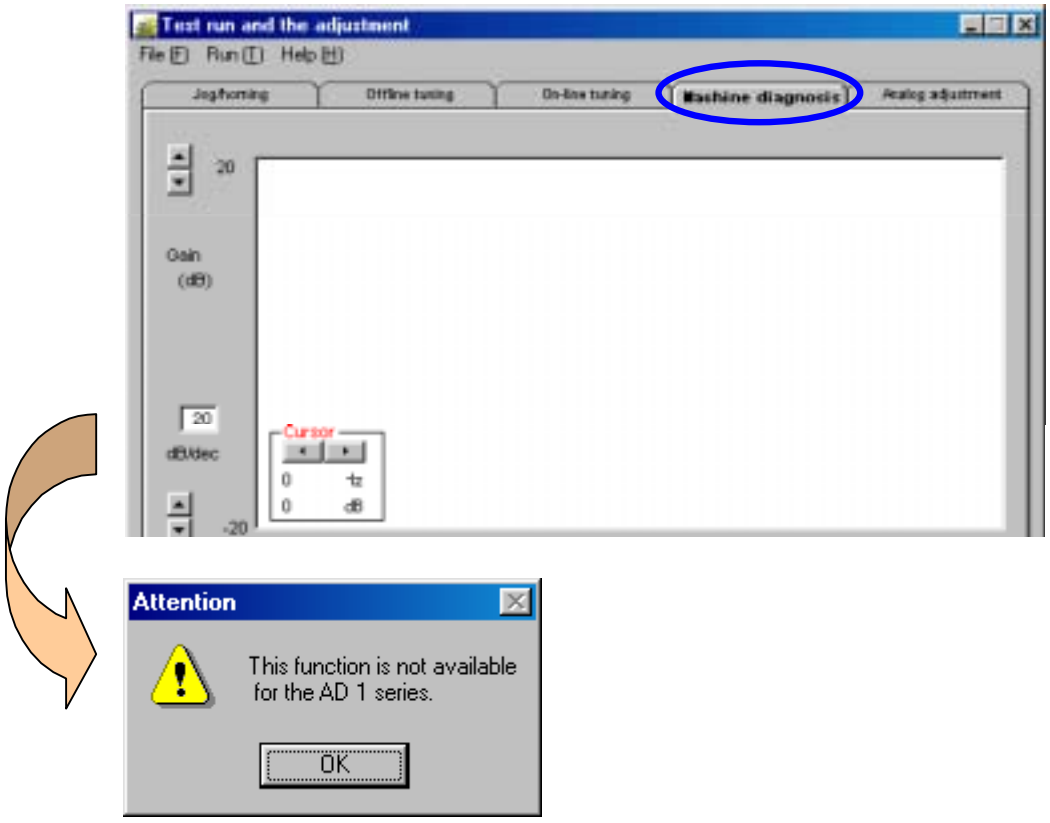
NOTE: This function is for servo drive AD2 only. It does not properly work for models earlier than AD2.

1- Make preparations as directed below:

Before making measurements, exercise the parameter setup function to set the parameters as shown in the following table:

Parameter name	No.	Setting	Initial value
Moment of inertia	Fd-00	Enter an approximate value.	Motor-specific value
Speed control cut-off frequency	Fd-01	5 to 10Hz	30Hz
Torque command filter time constant	Fd-06	0ms	2ms
Notch filter bandwidth 1	Fd-13	0dB	0dB
Notch filter bandwidth 2	Fd-15	0dB	0dB

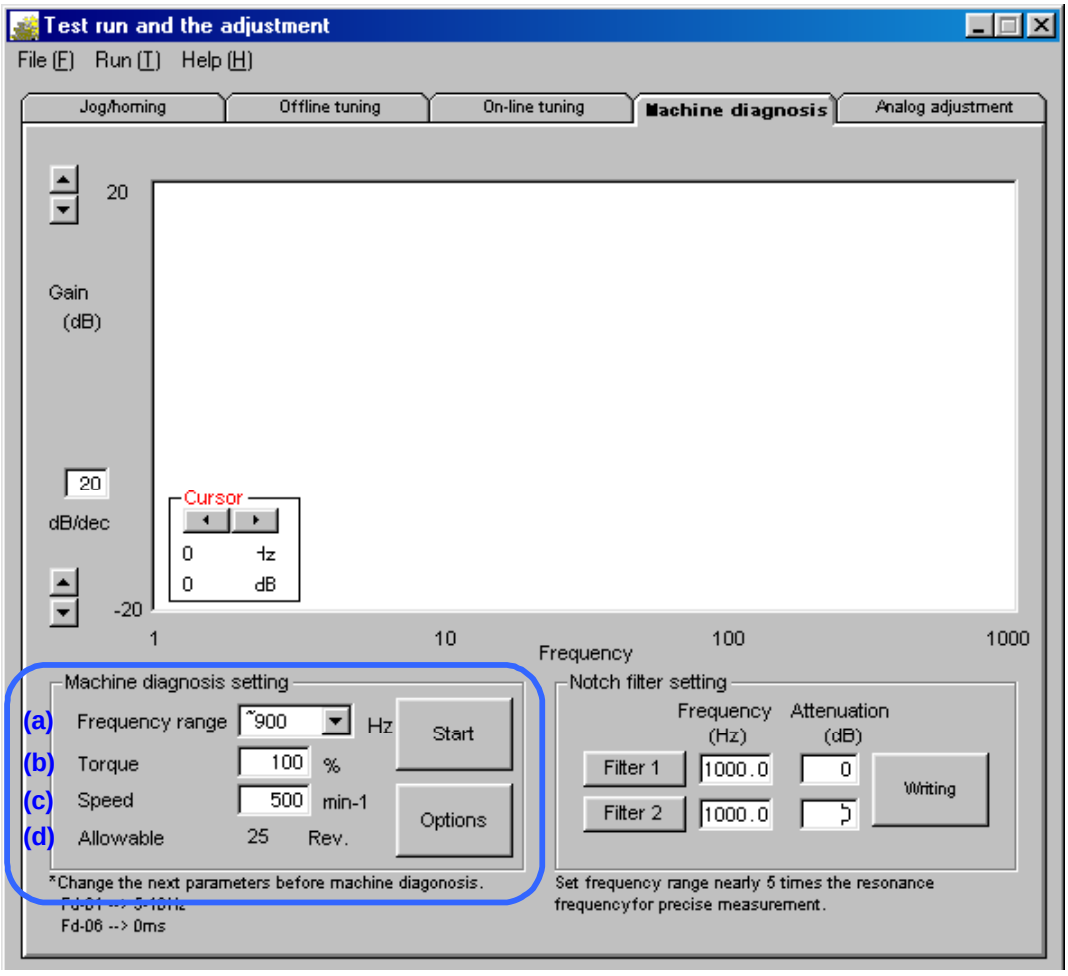
2- In the opening window, click the [Test Run and Adjustment (T)] button. The following window then opens. Click the Machine Diagnosis tab.



This function is for servo drive AD2 only. It does not properly work for models earlier than AD2.

For AD1, click [OK] and close the Machine Diagnosis window.
(AD1 series is showed as “AD series”.)
For AD2, click [OK] and proceed to perform the next step.

3- Perform mechanical system diagnostic setup as directed below:
From the Mechanical Diagnostics window, enter mechanical system diagnostic settings as explained below:



(1) Overall setup

Read the following instructions. If you are sure that your machine will remain intact and create no safety hazard, you can use the default settings for making measurements.

(a) Frequency range

Define the machine resonance frequency measurement range as directed below:

If an approximate resonance frequency is known:

Enter a frequency range that covers about fives times the approximate resonance frequency.

If an approximate resonance frequency is not known:

Select a range of "- 900 Hz".

After the resonance frequency is measured, you should set a frequency range that covers about fives times the measured resonance frequency, and then measure the resonance frequency again. It would produce a relatively accurate measurement result.

(b) Torque (command)

Set the diagnostic signal torque amplitude for mechanical system diagnostic measurements.

For measurement accuracy assurance purposes, you should select an adequately high amplitude (100% or lower). Note, however, that the higher the amplitude, the greater the torque applied to the machine.

(c) Speed (command)

Mechanical system diagnostic checkout is performed while an operation is conducted at a constant speed. Therefore, specify the constant speed by entering a speed command.

The entered speed should be between 100 min^{-1} and rated speed (3000 min^{-1} for the standard product), adequately high but not detrimental to the machine, and appropriate for stable rotation.

(d) Allowable (operation range)

The distance moved for mechanical system diagnostics is displayed in terms of the equivalent number of servomotor rotations. The machine comes to an immediate stop at the end of the mechanical system diagnostic checkout, but moves slightly more than the displayed value due to the inertia of the machine. You should reposition the servomotor so that the machine can move slightly in excess of the displayed number of rotations, decrease the speed command value, or reduce the operation range adjustment value, which is adjustable from the advanced setup by clicking [Options] button.

(2) Advanced setup

You do not have to perform advanced setup under normal conditions. However, you can enter any necessary advanced setup data by clicking [Options] button.

(e) Number (of data)

You can specify the number of FFT computation points for mechanical system diagnostics. The larger the number of points, the higher the measurement accuracy. However, the time required for a data upload will increase with an increase in the number of points. You can use a relatively low setting for making initial rough measurements and raise the setting for final detailed measurements to reduce the required measurement time. In principle, measurements should be at a maximum setting of 4096 points.

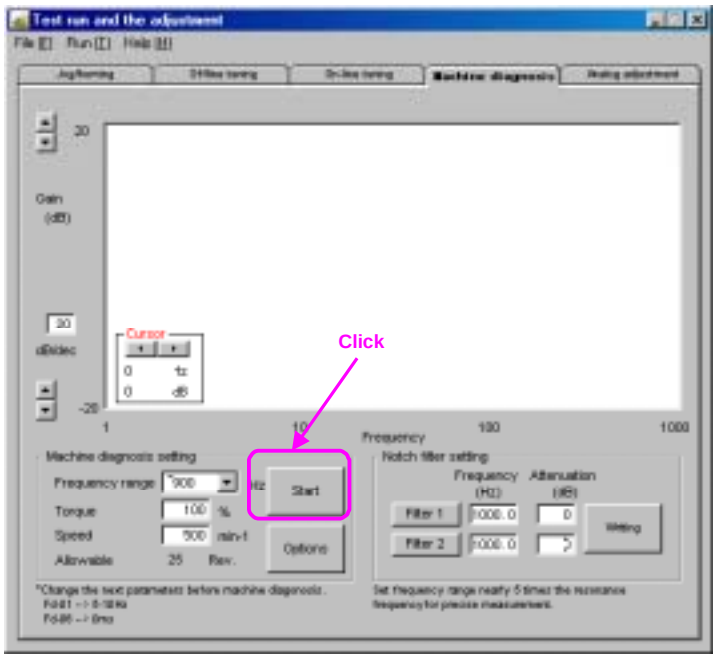
(f) Window (function)

A window function can be exercised for the data. If a measured waveform is messy, it may become clean when you change the window function option. You should basically use the "Hunning" setting for measurement purposes.

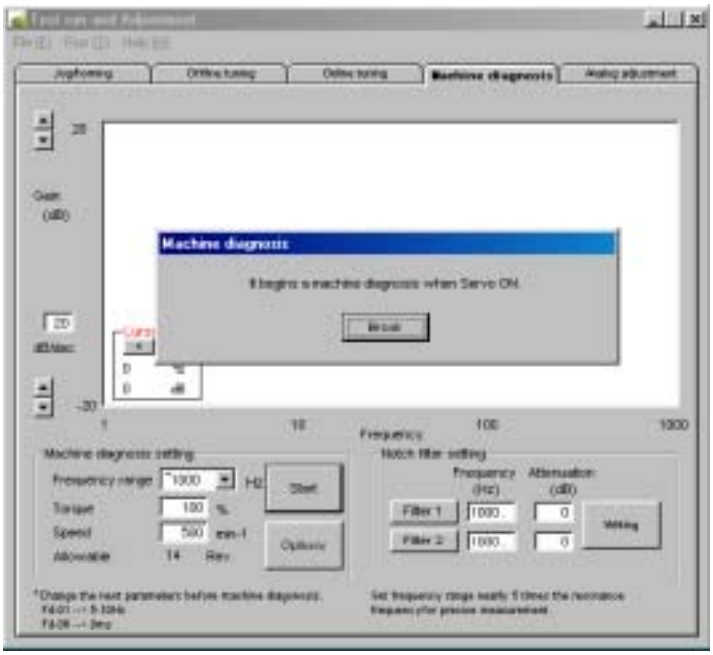
(g) Operation (range adjustment)

When you decrease the setting, the operation range for measurement decreases, but the waveform of a low-frequency region becomes messy. If the waveform of a low-frequency region is disordered at a default setting, you should increase the setting.

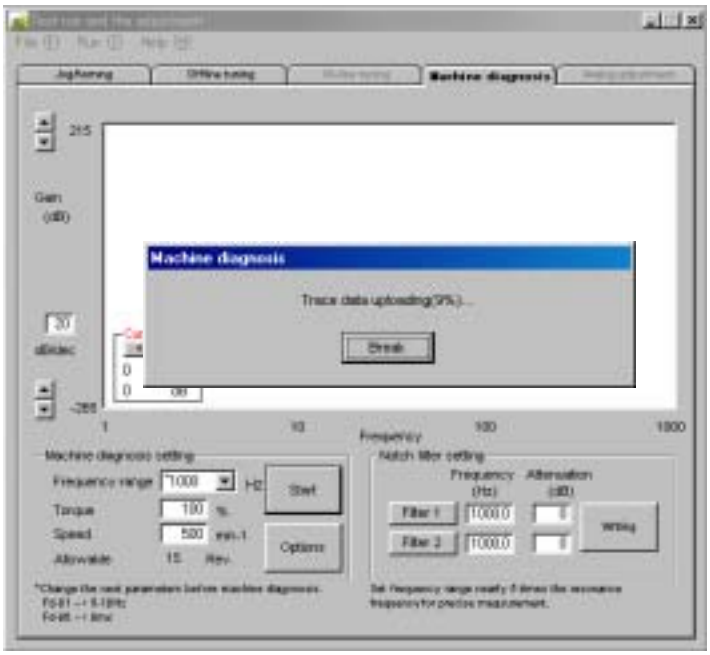
4- Start the diagnostic checkout by clicking the [Start] button.



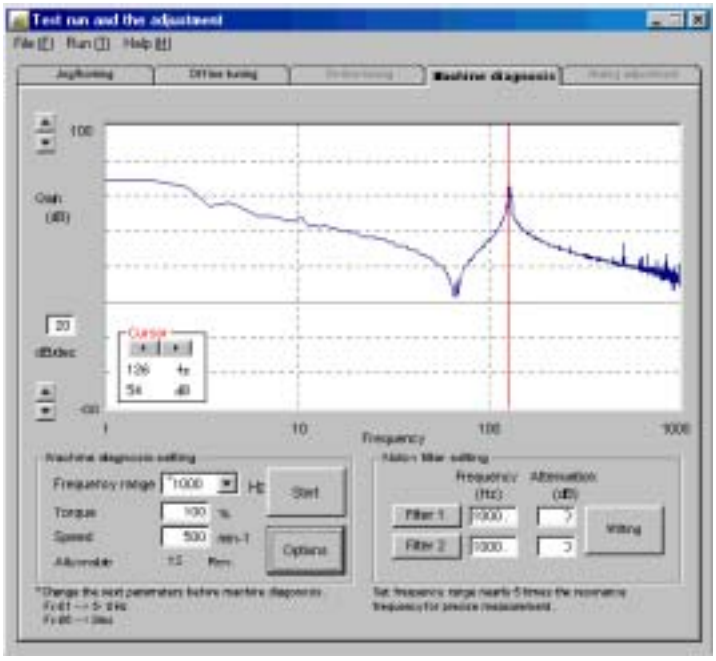
5- Turn on the servo ON(SON) signal.
The servomotor then starts rotating. In an emergency, turn off the servo ON signal.



6- When the operation ends, a data upload begins.



7- The mechanical system diagnostics window opens.



8- Turn off the servo ON signal, turn the RS terminal on and then back off, and exit the mechanical system diagnostics mode.

9- Observe the waveform to determine whether or not to make measurements again.

When the resonance point is properly measured:

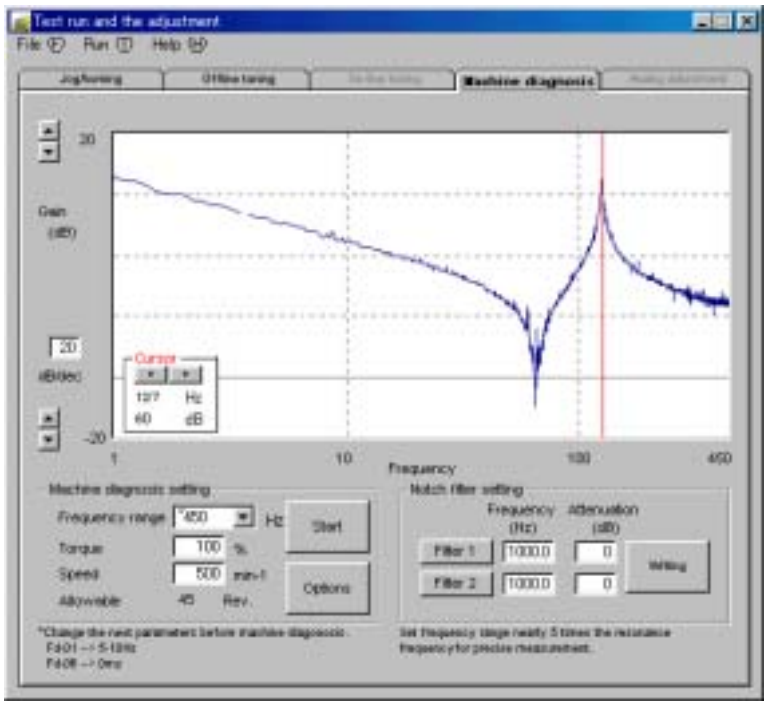
Proceed as directed below.

The waveform shown in Step 7- indicates that a relatively clear resonance point is measured. Therefore, you may proceed to next notch filter setup. However, if you make measurements again as indicated below, you might be able to measure a quite clear waveform as shown below.

When the resonance point is not properly measured:

Edit the measurement frequency setting (a) so that the measurement frequency is five times of a currently measured peak (similar to the pointed summit of a mountain) that looks like a resonance point, repeat Steps 4- and beyond until you obtain a clean measurement result. You should also edit settings (b) through (g).

The measurement result you will obtain after changing the setting might look like the figure below:

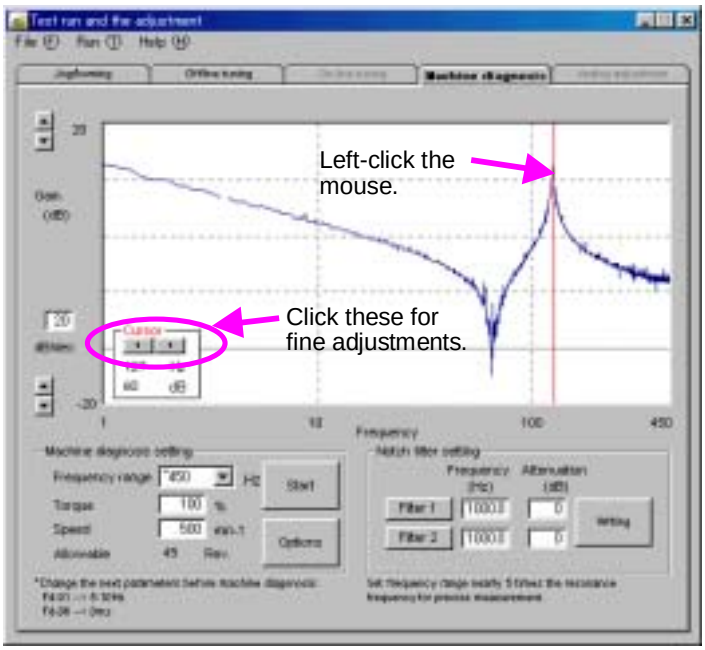


NOTE: You might not be able to obtain a clean measurement result shown above depending on your machine no matter how many times you edit the settings. However, there is no practical problem as far as the resonance point (a peak similar to the pointed summit of a mountain) is measured.

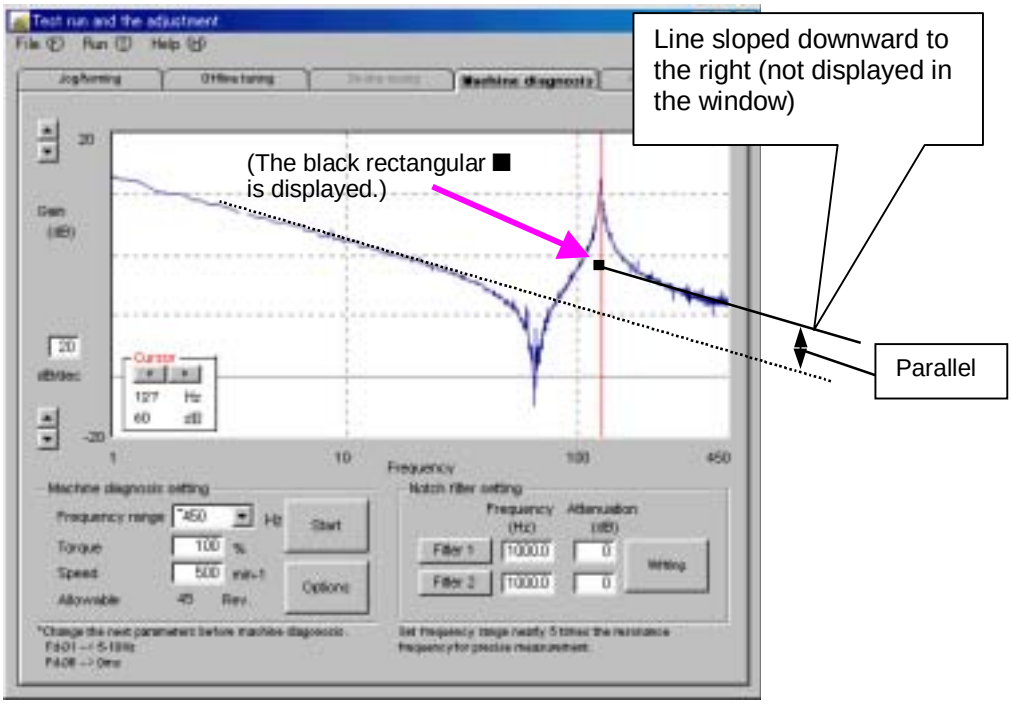
3.5.4 Notch filter setup procedure

The notch filter parameter can be set by performing the procedure described below (it is necessary to measure the resonance point as directed in the preceding section):

1- As shown below, left-click the mouse on a resonance point (a peak similar to the pointed summit of a mountain) within the waveform display area of the mechanical diagnostics window. If any fine adjustments are needed, use the cursor buttons on the left-hand side until the mouse cursor is positioned at the peak.



2- Right-click the mouse at the intersection of a perpendicular line drawn from the peak and the waveform line sloped downward to the right.



3- Click the [Filter 1] button. The recommended settings are then displayed in the boxes to the right of the clicked button.

4- You can set up to two resonance frequencies. If there is another resonance point, repeat Steps 1- and beyond and set it with the [Filter 2] button.

NOTE: If resonance points are close to each other, the servomotor operation may become unstable even when you properly complete filter setup. In such an instance, set a predominant resonance point.

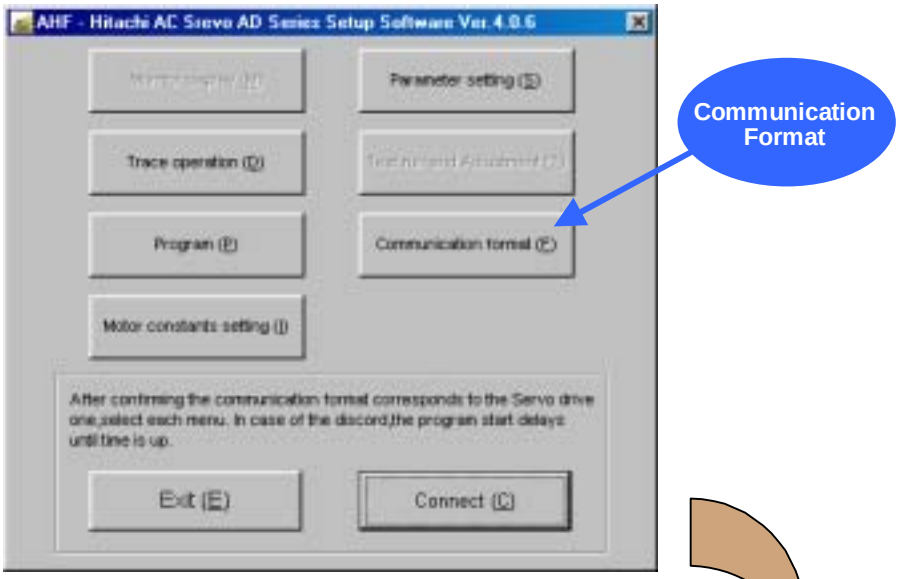
5- Click the [Writing] button. The settings are then transferred to the servo drive.

6- Restore the gain and other settings to their previous values, and then start an operation to check whether the degree of vibration is decreased. If the degree of vibration is not significantly decreased, slightly change the frequency setting (Fd-12/Fd-14) to locate a point at which the degree of vibration decreases. It is also well to remember that the notch filter function may effectively work when you adjust the bandwidth (Fd-13/Fd-15).

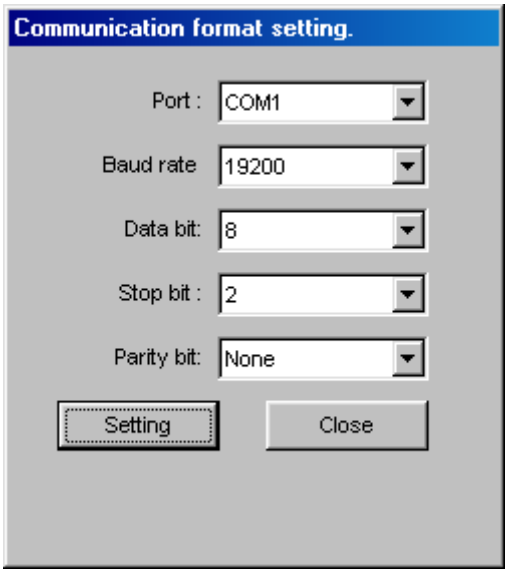
NOTE: Mechanical diagnostic measurements are to be used as a guide only. The measured resonance frequency may slightly deviate from what is correct.

3.6 Changing the Communication Format

1- In the opening window, click the [Communication format (F)] button.


AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Parameter setting (S)
Trace operation (D)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Connect (C)
Communication Format

2- When the following window opens, make necessary changes:



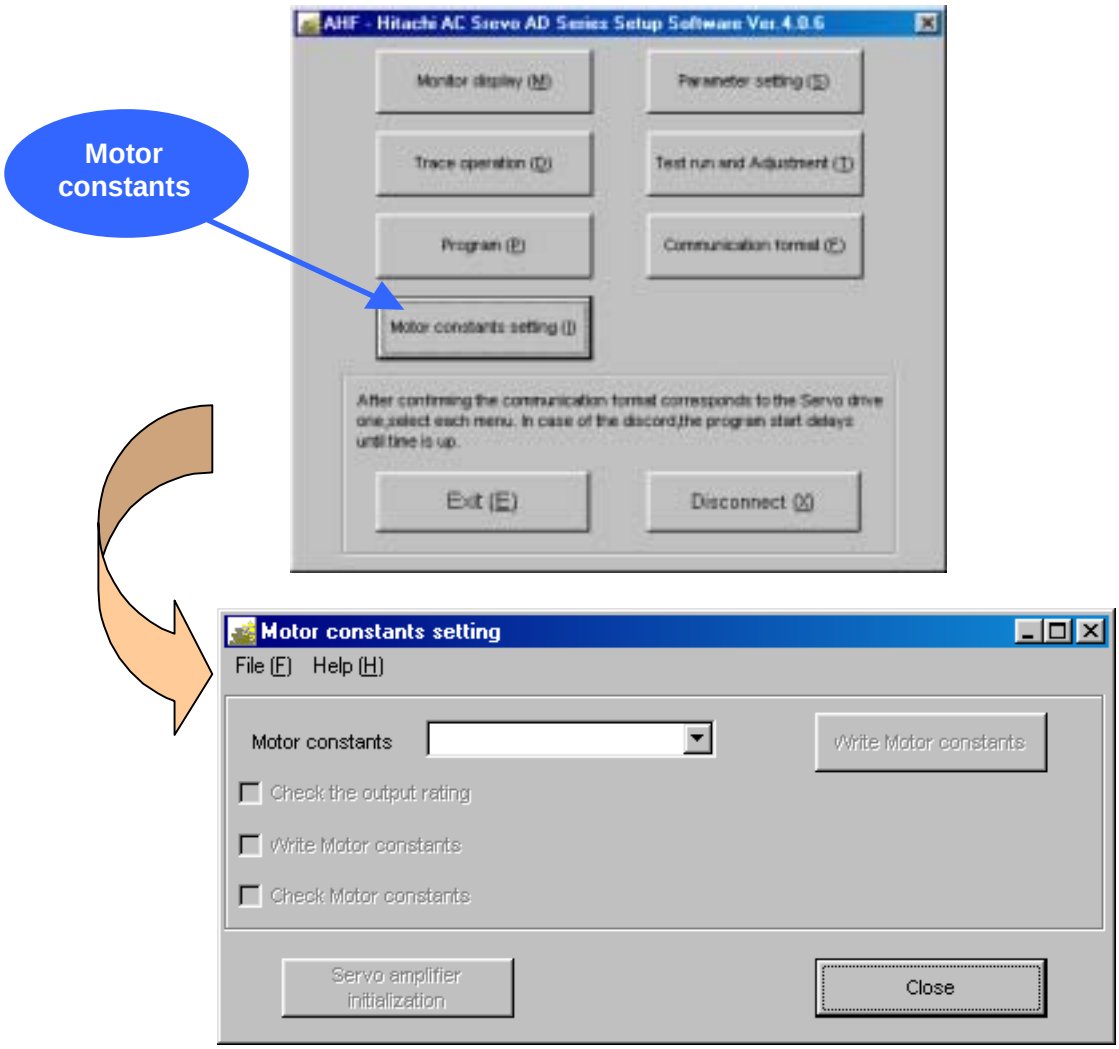
3- After necessary changes are made, click either of the following buttons depending on the situation:

When the connection is established: [Setting] button --- Changes the settings for both the servo drive and personal computer and establishes the connection again.

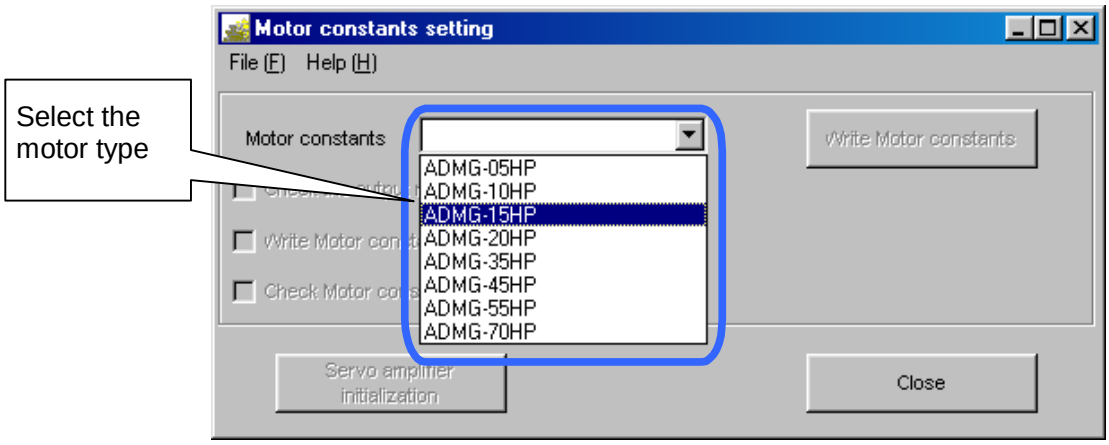
When the connection is not established: [Close] button --- Changes the settings for the personal computer only.

3.7 Setting Motor parameters

1- In the opening window, click the [Motor constants setting (I)] button. When the following window opens, set up motor constants according to the following points.

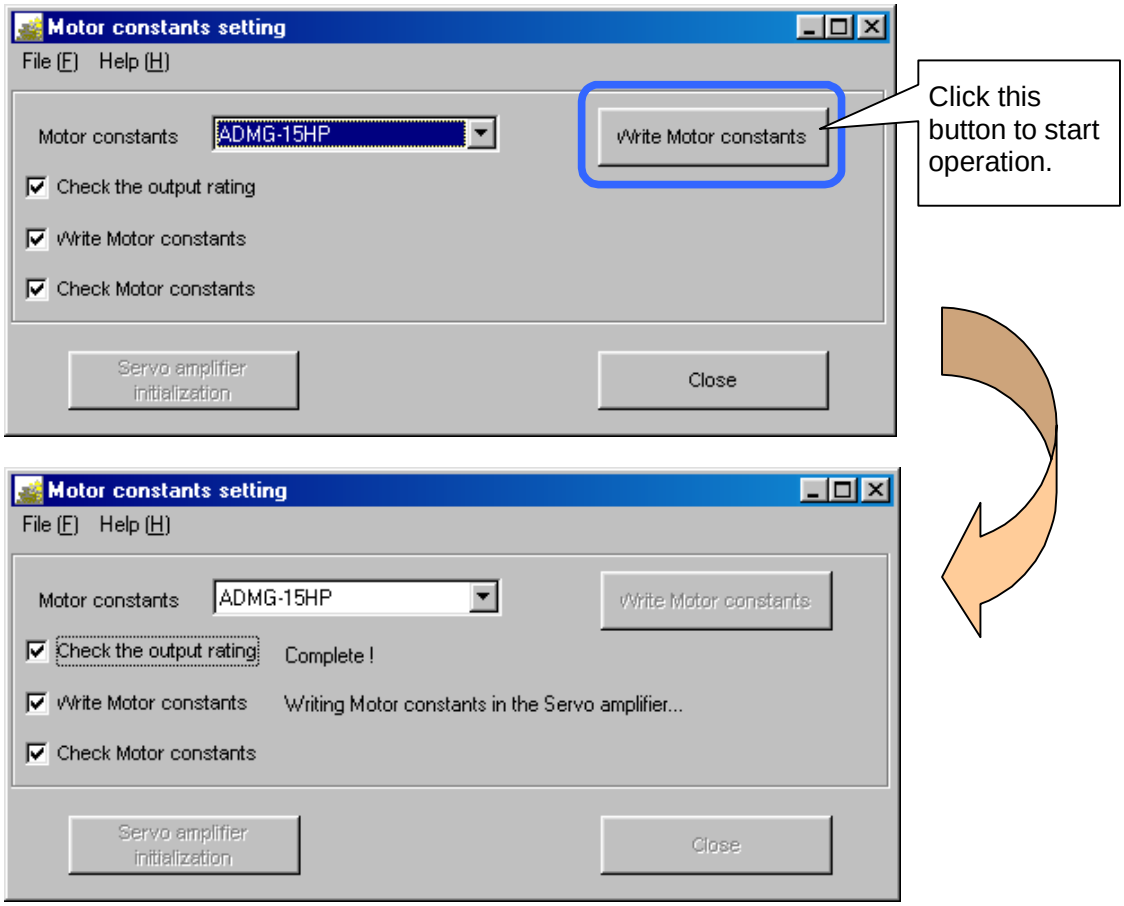

Motor constants
AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Monitor display (M)
Parameter setting (S)
Trace operation (D)
Test run and Adjustment (T)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Disconnect (X)
Motor constants setting
File (F) Help (H)
Motor constants
Write Motor constants
Check the output rating
Write Motor constants
Check Motor constants
Servo amplifier initialization
Close

2- Select the motor type from the pull-down button. Note that unmatched motor constants against the amplifier you use can not be set in the amplifier.

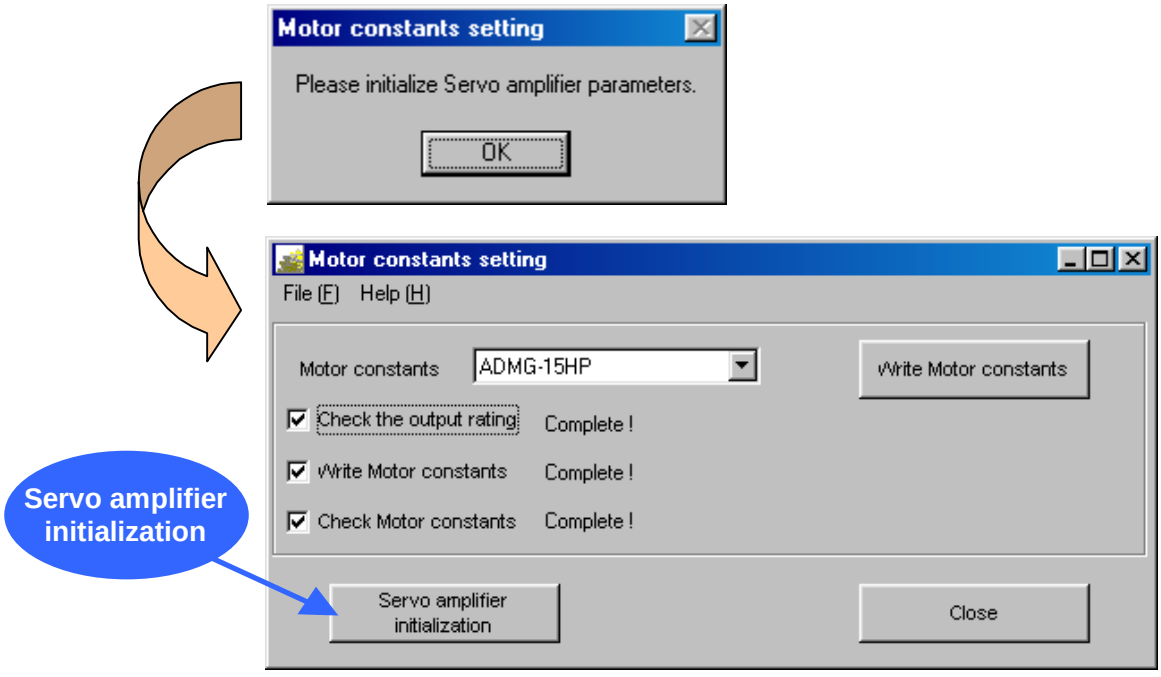


3- Click the [Write Motor constants] button.

It normally performs in order of “Check the output rating”, “Write Motor constants” and “Check Motor constants”. Which operation is performed is selectable by the check-box.



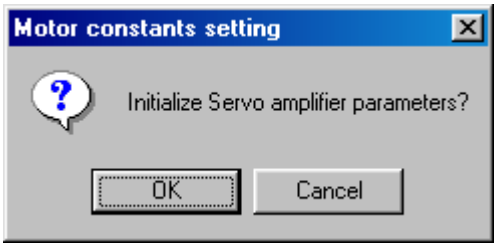
4- When the setting is finished correctly, the following message is showed. After that [Servo amplifier initialization] button is valid.



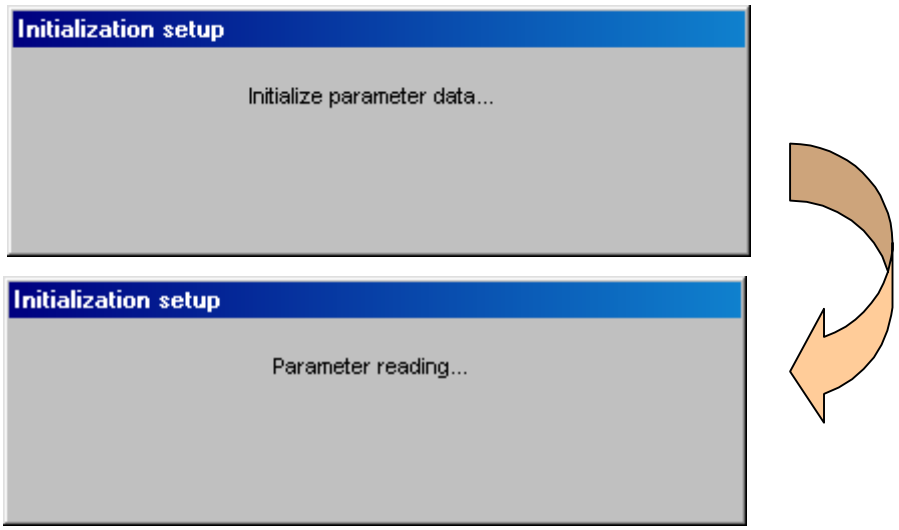
5- Click the [Servo amplifier initialization] button. As the following message is showed, click one of buttons

[OK] button : starts to initialize parameters in the servo amplifier.

[Cancel] button : cancels the initialization of parameters in the servo amplifier.

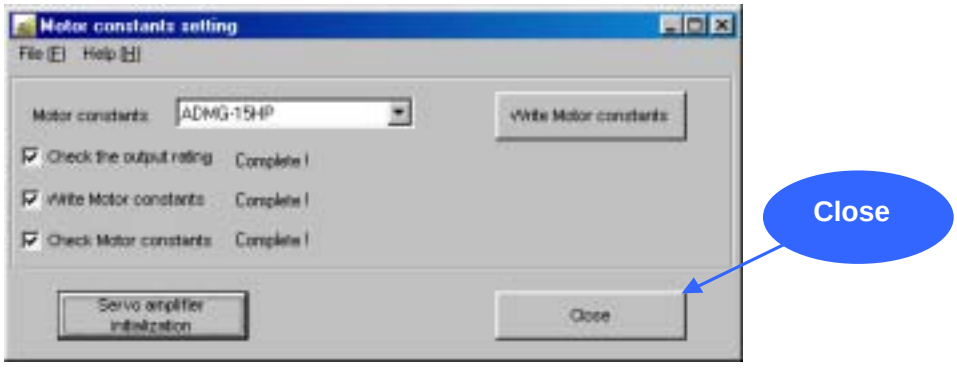


6- During the initialization, the following screens are displayed in order according to the status of process.



7- When the initialization is finished, the following message is showed. Before operation, be sure to power off and power on the control power circuit.

8- Click the [Close] button to finish the motor constants setting



In case that unmatched motor constants against the amplifier is selected :

the error occurs at the step of “Check the output rating”. And then the following message is showed.

Motor constants setting
File [F] Help [H]
Motor constants
ADMG-35HP
Check the output rating
Error!
Write Motor constants
Check Motor constants
Motor constants setting
Motor constants and the output rating of Servo amplifier don't match each other.
Please select the correct Motor constants
after confirm Motor constants and the output rating of Servo amplifier.
OK

Be sure to check the voltage class and output rating of amplifier and motor, and then select the correct motor constants.

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CHAPTER 4 Troubleshooting Guide

This section furnishes the instructions for troubleshooting the product when it malfunctions or erratically operates.

4. Troubleshooting Guide
   - 4.1 If the Servo Drive Cannot Be Connected 4-2
   - 4.2 If Parameters Cannot Be Written 4-2
   - 4.3 If Parameters Cannot Be Read 4-2
   - 4.4 If Parameter Initialization Does Not Work 4-3
   - 4.5 If the Operation Trace Function Does Not Properly Work 4-3

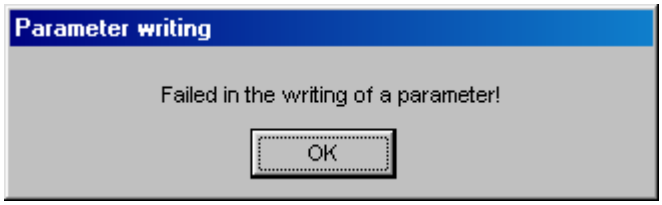
4. Troubleshooting Guide

4.1 If the Servo Drive Cannot Be Connected

If the servo drive cannot be connected, proceed as directed below.

Probable cause	Remedy
A wrong connector is used for connecting the servo drive to the personal computer.	Check the connector and use a correct connector.
The connection cable is improperly connected or in poor contact.	Check to ensure that the cable is properly connected and in proper contact.
The servo drive differs from the personal computer in baud rate or other communication setting.	Check the baud rate and other communication settings. Correct the personal computer or servo drive settings as needed.
The RS-232C port (COM) is improperly set. (Personal computer setting check --- Choose [Start], [Settings], [Control Panel], [System], [Device Manager] and then check the COM port setting.)	Note the personal computer's COM port setting for AHF, and then adjust AHF's "Communication Format" setting until it agrees with the personal computer's setting.

4.2 If Parameters Cannot Be Written



If the above message appears, proceed as directed below because it is conceivable that the problem cause is as indicated below:

Probable cause	Remedy
An attempt was made to rewrite a write-protected parameter while an operation was performed with the SON terminal turned on.	Turn off the SON terminal and write a parameter.
An attempt was made to write parameter data that was outside the acceptable parameter range.	Write data that is within the acceptable parameter range.
An attempt was made to write data while the servo drive was tripped.	Reset the trip with the RS terminal and then write data.

4.3 If Parameters Cannot Be Read

If the parameters can not be read from the servo drive, proceed as directed below because it is conceivable that the problem cause is as indicated below:

Probable cause	Remedy
An attempt was made to read data while the communication cable between servo drive and PC was break or the connector of the cable is not connected to PC and the servo drive firmly.	Check the communication cable and connect it to PC and the servo drive again.

4.4 If Parameter Initialization Does Not Work

If the parameter initialization does not be work, proceed as directed below:

Probable cause	Remedy
Parameters can not be read from the servo drive after initialization.	Confirm that the indication of the initialization is displayed on the digital operator built in the servo drive. Initialize the parameters again.
An attempt was made to initialize data while the communication cable between servo drive and PC was break or the connector of the cable is not connected to PC and the servo drive firmly.	Check the communication cable and connect it to PC and the servo drive again.

4.5 If the Operation Trace Function Does Not Properly Work

If the operation trace function does not properly work, proceed as directed below.

Probable cause	Remedy
Triggering was not achieved because improper trigger conditions were set.	Correct the trigger conditions.

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CHAPTER 5 Appendixes

5. Appendixes
5.1 Files to Be Copied to System.....5-2
5.2 Connection to a Personal Computer without a Serial Port (RS-232C).....5-3

5. Appendixes

5.1 Files to Be Copied to System

The table below lists the names of the files that are copied to the c:\ windows\ system directory when you install the software (it is presumed that Windows is installed on drive C.):

OCX files	COMDLG32.OCX
	MSCOMCT2.OCX
	MSCOMCTL.OCX
	TABCTL32.OCX
	PDQCOM32.OCX
	MSFLXGRD.OCX
	VSVIEW3.OCX
	VSFLEX6D.OCX
	ACSGRAPH.OCX
DLL files	MSVBVM60.DLL
	OLEAUT32.DLL
	ASYCFILT.DLL
	CMDLGJP.DLL
	COMCAT.DLL
	MSCC2JP.DLL
	MSCMCJP.DLL
	OLEPRO32.DLL
	TABCTJP.DLL
	VB6JP.DLL
	STRFMT.DLL
	FLXGDJP.DLL
	MSVCRT.DLL
	VB6STKIT.DLL
	MFC42.DLL

5.2 Connection to a Personal Computer without a Serial Port (RS-232C)

When using the AC Servo Drive Setup Software on a personal computer without an RS-232C port to establish a connection to the AD Series, it is suggested that you use the following PC card. If you use the following PC card, you do so at your own risk.

< PC Card >

Product name	PC Card Standard TypeII RS-232C PC Card
Manufacturer	RATOC Systems
Type	REX-5056V
Standard price	¥19,800
Accessory	9-pin D-sub (male) cable (50 cm)

< USB Serial Converter >

Product name	USB Serial Converter
Manufacturer	RATOC Systems
Type	REX-USB60
Standard price	¥5,980
Connector	USB (type A)
OS	Windows XP, Windows 2000, Windows Me, Windows 98 Second Edition

For details, visit the following:
http://www.rexpccard.co.jp/

Note, however, that no operational checkout has been completed to investigate the influence of the use of various installation sites (field use, etc.), different types of personal computers, and various other different operating conditions.
Therefore, it is well to remember that your use of the above PC card is at your own risk.

5.2.1 Connection procedures and precautions

(1) Installing the PC card

Install the PC card as directed in its documentation. Note what COM port the PC card RS-232C is assigned to in the installation process.

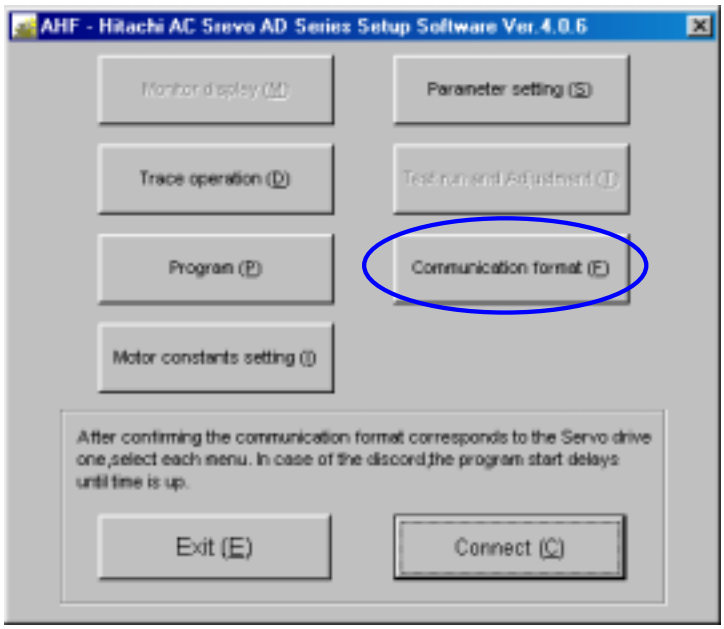
(2) Connecting Setup Software AHF

When you install and launch Setup Software AHF, COM1 is set up as the communication port. Therefore, change the assigned COM port to the above-mentioned COM port the PC card RS-232C and establish the connection by performing the following procedure (which presumes that the PC card RS-232C is assigned to COM2):

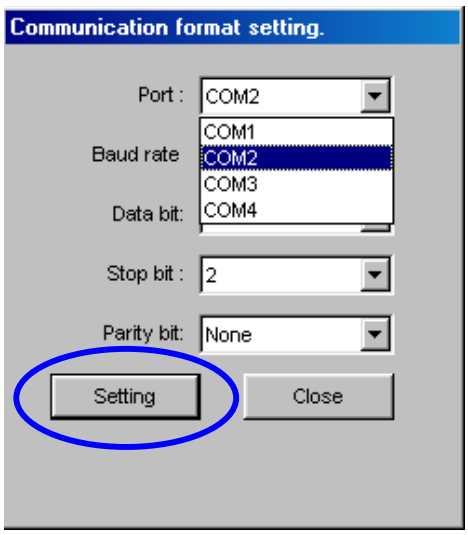
1- Launch Setup Software AHF.

2- Click the [Communication format] button.

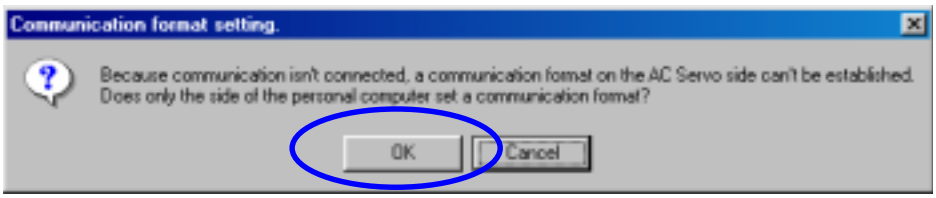
3- Set the communication port to COM2.


AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Parameter setting (S)
Trace operation (D)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Connect (C)

4- Click the [Setting] button.

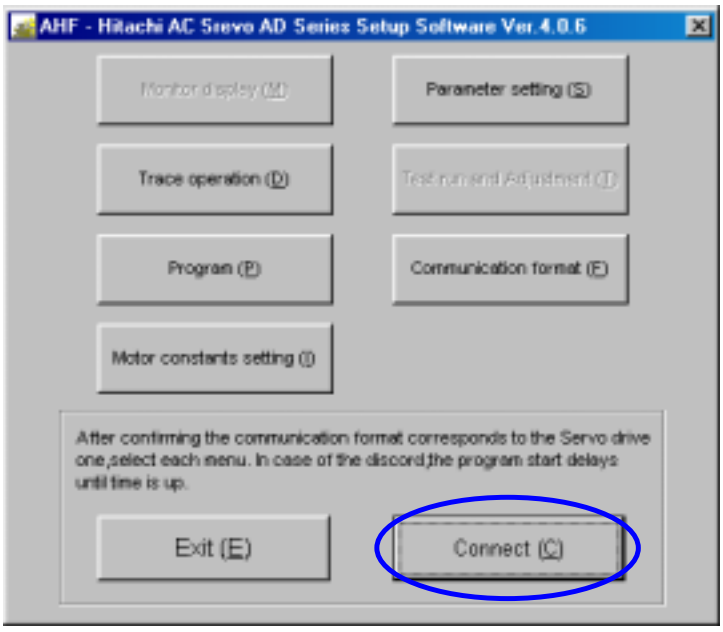


5- Although the following dialog box opens, click the [OK] button.


Communication format setting.
Because communication isn't connected, a communication format on the AC Servo side can't be established.
Does only the side of the personal computer set a communication format?
OK
Cancel

6- Click the [Close] button.

7- Connect the PC card RS-232C cable to the servo drive connection cable. Click the [Connect] button to establish the connection.


AHF - Hitachi AC Servo AD Series Setup Software Ver.4.0.6
Parameter setting (S)
Trace operation (D)
Program (P)
Communication format (F)
Motor constants setting (I)
After confirming the communication format corresponds to the Servo drive one,select each menu. In case of the discord,the program start delays until time is up.
Exit (E)
Connect (C)

If the connection is not properly established, check the COM port assigned to the PC card and the communication baud rate, data bit, stop bit, and parity settings for the servo drive. Ensure that the personal computer and servo drive agree have the same settings, and then try again to establish the connection.

The above procedure need not be repeatedly performed unless you uninstall Setup Software AHF. From next time on, just click the [Connect] button after Setup Software AHF startup to establish the connection.

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